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Reuse and Repurposing of Online Digital Learning Resources within UK Higher Education: 2003-2010

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Abstract

This research set out to examine developments in reuse and repurposing of online digital resources within higher education (HE) in the United Kingdom (UK) over a period (2003-2010), when the emphasis of educational resource reuse and repurposing activity shifted from reusable learning objects (RLO) to open educational resources (OER). It aims to contribute to understanding of this transition, and locates this shift within a broader picture of UK HE activity within the UK, and a wider understanding of reuse of learning resources in digital, online form.

The research presents a review and critical examination of the environment in which reuse practice occurred. It does this through macroenvironmental, mesoenvironmental and microenvironmental level reviews. The microenvironmental review is presented through research analysis of five case examples from UK HE and a sixth example from HE in Ireland. The mesoenvironmental review examines the significant changes in resource facilitation and practice during the research period. This thesis is particularly concerned with identifying and understanding *how* reuse of digital online learning resources was facilitated in practice, and *whether* reuse occurred, or occurred in the form(s) anticipated.

The thesis identifies and examines themes and factors which appeared to have influenced, or had potential to influence, reuse in each case. Cross-case comparison offers a synthesis of the research observations. Finally, a structured approach to classifying factors is suggested based on this research. This leads to generalisable recommendations of how to facilitate digital online resource reuse in the future.

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INSERT 7.1: CASE FACTORS/ISSUES COMPARED (A3 COLOURED INSERT)

Declaration of authorship

I, Chris Pegler declare that the thesis entitled **Reuse and Repurposing of Online Digital Learning Resources, within UK Higher Education: 2003-2010** and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research.

I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
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Pegler, C., (2007). *Choosing and re-using learning content: why neither is as easy as it sounds*. In: OpenLearn 2007, 30-31 Oct 2007, Milton Keynes.

Pegler, C., (2005). *Objects and Issues - a Sunday supplement view of continuing professional development in higher education*. Open Learning, 20(1), February, pp.51-64

Mason, R.D, Pegler, C.A., Weller, M.J., (2005). *A learning object success story*, Journal of Asynchronous Learning Networks, 9(1), pp. 97-105

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Weller, M. J., Pegler, C. A. and Mason, R. D., (2003). *Working with learning objects - some pedagogical suggestions*. In: Communities of Practice. ALT-C 2003 Research Proceedings. 8-10 Sept, 2003, University of Sheffield & Sheffield Hallam University

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CHAPTER 1: Introduction

1.1 Aim of the thesis

This thesis is centred on exploration and examination of reuse of digital online learning resources within higher education (HE) in the UK from 2003-2010. This period was selected as one during which reuse activity, focused on resource sharing in online digital form, became a particularly prominent and complex activity across and within many UK higher education institutions (HEIs).

The research offers a review and critical examination of the environment in which reuse practice occurred. It does this through macroenvironmental, mesoenvironmental and microenvironmental level analysis. The first of these, the macroenvironmental analysis, focuses on the wider political, economic, societal and technical trends impacting in UK HE over this period. These trends emphasised reuse of digital online resources as a desirable objective leading to direct funding for technologically-mediated reuse activity at a national level. Prior to the research period, emphasis on learning resource reuse activity was at *intra*-institutional rather than *inter*-institutional level.

The shift towards technologically-mediated reuse activity, in response to specific shifts in UK HE resulted in changes directed at achieving online digital resource reuse. This intermediate *meso*-level activity included establishment of repositories, developing metadata schemas and other technical standards, and a focus on licenses to reflect new approaches to IPR (intellectual property rights including copyright). This last change allowed sharing of resources with fewer restrictions, as open educational resources (OER). During the research period initiatives directed at specific contexts (microenvironments) were funded to promote and

engage with reuse of online digital resources at personal, institutional, disciplinary and national levels. Broader shifts in technology use in learning and teaching at HE level supported online activity by individual educators and developers, and their institutions. The expressed motivations for reuse activity, as the cases in this thesis illustrate, were often associated with progressing or informing these shifts.

Activity which was specifically directed at facilitating reuse and repurposing, responding to macroenvironmental level emphases and affecting microenvironmental activity (e.g. at the level of individual, module, repository, collection or community), has been described in this thesis as *mesoenvironmental* activity. The term mesoenvironment has been used in business practice to describe the level of activity at the organizational level where the micro- level represents the individual or group (Holland, 1987). It has been used within educational technology to describe levels between micro- and macro- (Jones and Dirckinck-Holmfeld, 2009 and Conole, 2010a). In this thesis it represents focused sector-level reuse activity (further explained in Section 3.1).

The microenvironment, the most context-specific level of activity, is represented through analysis of six case examples, five from the UK and one from Ireland. This thesis identifies and examines underlying problems and challenges relating to each case, to inform understanding of how and why reuse of digital online learning resources was facilitated, and whether or not reuse occurred, or occurred in the ways anticipated.

Themes which emerged from observation and analysis of the individual cases are identified. The cases and the factors noted from these were then subject to cross-case analysis leading to identification of three broad classifications. These represented three themes into which reuse factors could be categorised.

1.2 Overview

Interest in facilitating reuse of educational resources and more effective use of scarce resources in general, attains particular significance when demand for higher education is growing rapidly. Developers of new learning and teaching resources are placed under pressure as new curriculum areas emerge, without an established educational resource base or experienced practitioners to support new students. In periods of contraction within UK HE, such as that experienced at the time of writing, a smaller workforce leaves individual academics with less time to create new resources, or to update and adapt existing ones. Access to educational technologists and support staff to assist in creating or adapting resources to online format, is also likely to be more limited. The shift towards migrating resources into online teaching environments has been a continuous trend in higher education throughout the research period leading to increasing demand for online digital resources. This online teaching trend has also often been at odds with the availability of skilled staff to support it (e.g. South and Monson, 2000, McNaught, 2003).

Reuse is not a new or novel concept within higher education. However, the emphasis on reusing or repurposing (i.e. using online digital resources with or without modification) is new. Existing resources may simply be reformatted, e.g. from print to portable document file (PDF) format, or from overhead transparency slides to PowerPoint slides, with no other change in content. However more radical redesign of the new digital form can also occur. There was considerable emphasis placed on 'reusable learning objects' (RLOs) during the research period (see Section 1.4 for definitions of this term). RLOs were widely recommended as a new approach to creating resources which provided significant advantages in facilitating reuse of digital learning resources. McGreal (2004) illustrates the level of enthusiasm amongst educational researchers during this period, and the high expectations of this particular approach: 'From anything and everything to specific digital learning resources, the future of

learning is inextricably linked to the development of quality LOs'. (McGreal, 2004, p14). While this level of optimism was misplaced, emphasis on RLOs has influenced reuse initiatives in UK HE throughout the research period.

1.3 Learning and teaching resource reuse in UK HE

Teaching practice in UK higher education (HE) has for centuries accepted and incorporated reuse of previously published resources (e.g. books). Reuse in this sense, assumes use of material which was created for one teaching and learning context within another context without altering the resource. Material reused in this way has often been designed and/or written by experts other than the teacher recommending or referring to the resource. These resources may be artefacts which although used or referred to in teaching were not made with an educational purpose in mind. As many teaching resources are not perishable, resources which are decades, or even centuries old, may still be referred to and used (reused). Users are making use of reproductions of the original manuscript in the form of print book without 'using up' (consuming) the resource. Resources can be passed between students, or teachers, or loaned from libraries. A digital copy of a book (e.g. ebook) can serve the same purpose as the print original and also address additional requirements in its new format (e.g. through a search facility). In contrast, a digital copy of a sandwich (e.g. a video or image) cannot replace the original. Its use is based on a different model of consumption and reuse (as sandwich) has little meaning.

University teaching and learning is already familiar with reuse in its conventional sense, with activity with successive students occurring around the same set of physical resources. Reuse also occurs in the form of reference to, or quoting from, resources created by other experts. This style of referencing is considered to provide evidence of good academic practice.

Academics as part of their professional activity are expected to illustrate familiarity with the

work of others, by referring to and quoting or citing, i.e. 'using' resources. This provides evidence of familiarity with these sources. The literature review is an important demonstration of academic competence within doctoral research, part of an academic's formal training. There are many examples of this type of reuse recurring and encouraged in education through reading lists and bibliographies.

Reliance on printed formats requires each student, as well as the teacher, to have physical access at some point to the learning resource, or to a physical copy of it. This places constraints on the amount of use possible where copies cannot legally be made. Given these logistical difficulties, it is unsurprising that academics may create their own alternatives as substitute resources. A lecture on the published work of a particular expert, with students taking notes, can provide a convenient and effective alternative to students' reading the primary source. This approach pre-dates the availability of printed books. Lectures were originally based on reading aloud manuscripts, so that students could create their own handwritten copies through dictation (Brown and Race, 2002).

When reuse occurs in education through selective quotation, or use of extracts, identification of the original source is required to maintain academic credibility. Beyond the normal rights of attribution accorded under international copyright law there are additional academic conventions applied to this type of reuse. Penalties for plagiarism apply when staff and students do not make clear where the work of others is referred to (i.e. reused).

Reuse by reference, to support educational activity, has achieved special consideration within law in the UK. The principle of allowing copying for research and private study, for criticism and review, or for setting examinations, are recognised as exceptions to the application of the UK Copyright, Designs and Patents Act, 1988 and its revisions (HMSO, 2011). Through these

'fair dealing' provisions the Act creates scope for reuse of small parts of copyright material within education without obtaining prior permission to make a copy, as long as sufficient acknowledgement is made. These exclusions are largely aimed at assisting educational institutions and individual students to reuse copyright work by referring to it. The Act reflected normal academic practice.

Fair dealing offers opportunities for reuse which are at odds with the usual prohibitions within copyright legislation. Replicating content which is under copyright protection (e.g. part of a published text) is not legally permitted activity in other contexts. Copyright owners are usually able to prohibit reuse, or request a fee in exchange for permission. Although limited in scope, the fair dealing exceptions recognise the importance within education of allowing selective reuse of copyright resources. The Copyright Licensing Agency agreement (CLA, 2008) extends permissible copying by HEIs, on behalf of their students, making more extensive reuse legally possible. Again this was a special arrangement with publishers recognising that reuse was a common, perhaps unavoidable, activity within education. Online reuse of digital resources could have been expected to represent simply a more convenient, relatively unproblematic, extension to existing practice within UK HE. The technology is not however subject to the same limits as exist with physical copies and new patterns of reuse became possible.

At the start of the research period, as explored further in Chapter 3, researchers anticipated a different type of resource reuse in education than had previously been possible. It was suggested that RLO activity would generate new types of resource use and facilitate entirely new pedagogical opportunities

Much of this excitement and anticipation derived from expectation of greater automation in the form of online teaching. Through digital delivery of selected chunks of content it was

anticipated that resources could be drawn from a variety of sources without the direct intervention of the teacher or instructional designer. The importance of this aspect of online resource delivery became less relevant, or at least less desirable, as the period progressed. Weaknesses in the model of automated reuse within HE were anticipated in criticisms of RLO automation by Wiley (2000b). However, initial expectation that this would occur, may have directed researchers' attention away from less impressive reuse opportunities, realisable through use of RLOs within conventional university practice.

Resource reuse within UK HE already existed on the basis of referring to, and extracting from, as well as sharing and consuming, resources in physical formats. In addition some researchers (e.g. Pegler, 2005a, Beetham, 2011) have suggested that where the ideas within a resource influenced teaching staff to create new resources, this too was a form of reuse. Conole (2010b) suggested that 'open practice' occurs when the design of a resource is reused rather than its content. Evidence of this type of reuse was apparent in the cases examined in this thesis. While this reuse is again a form which has existed in HE for centuries, access to resources has been transformed by improvements in availability of online digital forms of resources and increasingly effective user-friendly search facilities.

Reuse of ideas in the 'influenced by' sense, is difficult to evidence through research as there is usually no record of how and when this occurred. The user may not be aware that they have been influenced by resources accessed briefly and some time ago. They may not have used appropriate attribution. This thesis is therefore principally concerned with evidence of changes in practice, where reuse occurred in relation to a specific resource, or set of resources. It focuses on experience of reuse of digital online resources which can be recognised and recalled as reuse by the user and researcher.

Conventionally the consumption of a physical resources in education was 'rivalous', limiting the opportunity for others to use the same resource, in the same way, at the same time (Benkler, 2007). Educators could, as a partial solution, adapt use so that the same book could be used by one student, with direct annotation, or reused by many with annotation made on separate worksheets or in workbooks. Digital online resource consumption can be non-rivalous, so resources can be consumed differently, as though they were personal copies of the student, while remaining reusable in the same way, at the same time, by others.

1.4 An outline of definitions

The term 'reusable learning object' (RLO) has been used in this thesis, so far, without definition and has been used interchangeably with the term 'learning resource'. The confusion over what constituted an RLO was at the heart of confusion about what researchers anticipated this would contribute to learning and teaching (as further discussed in Chapter 3). The following list offers an overview of the variety of descriptions applied to reusable learning objects:

'Any entity, digital or non-digital, which can be used, reused or referenced during technology supported learning'. (IEEE, 2002, p5)

'Any digital resource which can be reused to support learning'. (Wiley, 2000b, p7)

'A fundamental idea is that a learning object **can stand on its own and may be reused**'. (Koper, 2001, p4)

'These objects may or may not have been originally created as learning objects; it is their **use for learning purposes** that makes them learning objects'. (Srijker, 2004, p1)

‘A learning object is any resource that can be used to facilitate learning and teaching and has been **described using metadata**’. (Jorum, 2004, p8)

‘The **smallest element within an online course** that defines a learning activity’. (Darby, 2003)

‘LOs must be **free-standing, non-sequential, coherent and unitary**’. (Longmire, 2000)

The distinctive part of each description is emboldened in this list. These highlighted phrases indicate that different RLO researchers variously valued the structure, the use of metadata, the use made, the reuse potential, the digital nature, or the level of granularity of the resource. At its broadest, the definition by IEEE (Institute of Electrical and Electronic Engineers) suggested that any resource, even those which are not digital in form, could be described as learning objects.

This is not an exhaustive list of definitions. For example, McGreal devotes six pages of his 14-page Introduction in *Online Education Using Learning Objects* (McGreal, 2004) to identifying and classifying RLO definitions. This illustrates how complex the task of defining the subject area had become. The range of definitions corresponded with the wide variety of expectations that researchers applied to reusable digital online resource reuse. Since this research is principally concerned with the reuse potential of online, digital resources used (or useable) within HE, the following definition is used unless otherwise specified: ‘A learning object is a digital piece of learning material that addresses a clearly identifiable topic or learning outcome and has the potential to be reused in different contexts.’ (Weller, Pegler and Mason, 2003a).

Compounding the complexity of this research area, the term 'reuse' also requires clarification. This has been used to describe several different types of activity, from use of a tangible object, to quoting from one resource within another. The 'reference to' sense, where the original resource is unaltered, can equate to linking to an online resource, or a section within it.

Distinguishing between the terms *use* and *reuse* can be problematic. What represents *use* within one context may be *reuse* in another. Where information about *prior use* is not available or applicable (e.g. if the resource has been created specifically for reuse by others), it may not be possible to accurately classify use activity as *reuse*. As use of digital resources may not leave a trace, lack of evidence of reuse is also not necessarily lack of reuse. While downloads of online resources may contribute information about popularity, they are not a guarantee of use, only evidence of acquisition. The term RLO has therefore frequently been applied to resources which have not yet been used, and may not be used. The term 'reusable' refers to a format, i.e. one which increases the potential for reuse. Within this research 'reusable' is used to describe a resource which could be reused, and the activity of *reuse* 'as is' (without change to the resource), is used in the same sense as use.

With online digital resources, new forms of use/reuse became possible. Within this thesis, the term *repurposing* is used to describe examples of reuse where a resource has been digitally altered to make it more suited to its new context. The origins of the term are not known, but it has been frequently used to refer to adaptation within reuse (e.g. Boyle, 2003). Changes made can be significant or minor. Some commentators have suggested that reuse potential can be dependent on the ability to repurpose (e.g. Kernohan, 2010) The term 'generative learning object', was coined by RLO Centre for Excellence in Teaching and Learning (RLO-CETL) (Boyle, 2008) to describe their approach to reuse design in anticipation of repurposing.

An alternative term for reuse with modification is *versioning*. This describes activity most often associated with distance learning, where a particularly formal approach to updating resources exists. Versioning was used by the UK Open University (OU) CoUrse Reuse and VErSIONing project (CURVE, 1999-2003) to describe aspects of the OU's own reuse activity (CURVE, 2004). The CURVE project (described in Section 3.4) identified several designs and functions for resource reuse, including pre-versioning. Pre-versioning reflected several ideals which are also common to RLOs, for example greater granularity (reduction of resource size to small stand-alone segments). Reuse, depending on context, may therefore be described as use, versioning or repurposing.

1.5 Emergence of research questions

The research questions were informed by an early review of the literature (2002-2003) and experience of RLOs (also during 2002-2003) within CS1-H806 (Case Study 1: H806). As the data from other cases was analysed, initial assumptions about reuse, and the factors influencing this, were challenged. A shift in the emphasis of the original questions was required.

Initially five research questions were identified. Three questions emerged as the most relevant and these are actively explored in Chapter 4 (Methodology) and in Chapter 8 (Conclusion).

1. **What facilitates reuse of learning objects in the later stages of the learning object lifecycle?**

The term 'learning object' is used here as defined by Weller, Pegler and Mason (2003a). That definition, as do many others, can be applied to any digital resource, used for learning or teaching, which is designed for, or capable of reuse. Optimal reusability is usually understood to apply to resources which are internally-cohesive, and de-coupled from other resources (i.e. stand-alone) (Longmire, 2000). However if repurposing is

possible other types of resource may also be reused. The learning object lifecycle covers stages in sharing for reuse as well as use and is explained further in Section 1.6.

2. **What models of reuse of learning objects are being explored and currently in operation in UK universities?**

This question recognised anticipation of a new approach to resource reuse given the shift to online digital resources, principally RLOs. This question also considered development of economic models for reuse (McGill, et. al, 2008), and responses to the pedagogical challenges of reuse.

3. **What potential advantages other than reusing content does sharing of learning resources, such as learning objects [as defined in 1 above], afford within UK higher education?**

This question noted that the broader expectations of RLOs might differ from those anticipated, for example:

The excitement of learning objects is not that we can now efficiently develop, classify, and distribute little bits of content. That is pretty ordinary didactics. The excitement is in developing the epistemological, pedagogical and philological resources and strategies by which we can span the quadrants [covering all fields of knowledge]. Unless we do that, learning objects will not cross those boundaries (except in the acts of increasing semiotic violence of poaching, appropriation, and excorporation). That we develop only intra-disciplinary libraries of learning objects is not a bad thing. It is simply so much less than what could be. (Anderson, 2003, p15).

While research Q1 is concerned with identifying and explaining why RLO uptake was, or was not, successful in particular contexts, Q3 considers whether there were additional unanticipated consequences in reuse activity. These could have positive or negative effects. As the emergence of unexpected effects may take considerable time to emerge, this question cannot be comprehensively addressed within this thesis.

All three questions were explored, although the first question ‘What facilitates reuse of learning objects?’ has been the primary research question. The reference to a learning object lifecycle is explored in more depth below, illustrating some of the complex challenges that research in this area presented

1.6 Stages in the learning object lifecycle

Strijker (2004) in his doctoral research identified six stages in a learning object lifecycle:

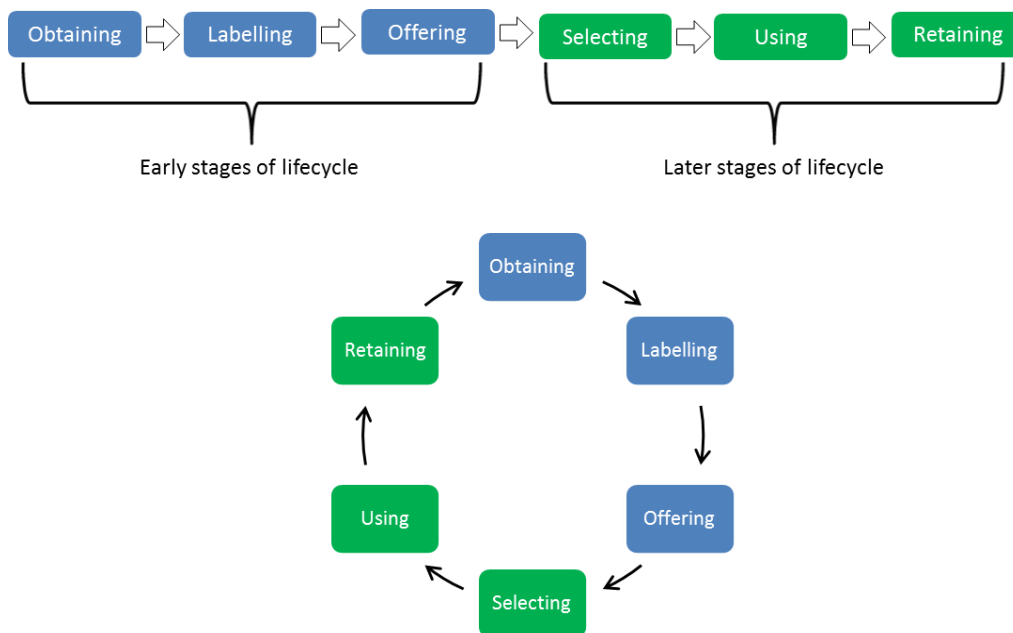
Obtaining, Labelling, Offering, Selecting, Using and Retaining. This is the ‘learning object life cycle’ referred to in the first of the research questions. These six stages, and the emphasis Strijker places on these, offer an overview of researcher conceptions of reuse of digital resources during the early part of the research period. Although he uses the term ‘learning objects’ his definition, as noted in Section 1.4 above, was not necessarily associated with reuse: ‘These objects may or may not have been originally created as learning objects; it is their use for learning purposes that makes them learning objects’ ” (Strijker, 2004, p1).

However the cycle that he described assumed reuse and the term ‘learning object’ and ‘reusable learning object’ were used by Strijker, as by many other researchers, synonymously.

In identifying lifecycle stages, Strijker observed that his own research, as did that of other researchers, concentrated attention on the early part of this learning object lifecycle. That is the stage which prepared for reuse: Obtaining/Creating; Labelling (e.g. adding metadata); and

Offering (e.g. uploading to a repository) (Strijker, 2004, p15). Although described as a 'lifecycle' he displayed the headings as a linear range of adjacent cells within a table. Figure 1.1 offers an alternative display using the same terms and sequence as Strijker.

Figure 1.1: Representations of Strijker's Learning Object LifeCycle



Source: adapted from Strijkers, 2004 (Figure 1.4, p16)

Figure 1.1 illustrates both a linear flow, starting with Obtaining and ending with Retaining, as Strijker did, and also a continuous cycle, with the resources retained, becoming in turn the resources obtained. As Strijker describes his 'cycle' as having earlier and later stages, he perhaps recognised only the linear form. This would reflect uncertainty in a process where resources retained are not necessarily obtained (for reuse) by others. The progress from offering to use is not straightforward and may skip stages.

Strijker described the resource as being used (he uses the term 'using') rather than as reused or reusing. He was perhaps, noting the problem of expecting to identify *reuse* rather than *use* in researching this topic.

As the concern here is reuse (used in the wide sense described in Section 1.3), the focus is on what Strijker described as the later stages of the lifecycle (those shaded green in the figure). As a cycle, later use/reuse of resources will be affected by activity at earlier stages which represent preparation for use/reuse. It is particularly apparent, in the case analyses (Chapters 5-6), that there is often a significant difference between the earlier and later stages. The difference relates not only to the chronology, but to who participates. In Figure 1.1, earlier and later stage activities are shown in different colours to represent not only a change in emphasis (from preparing to use, to actively using/reusing), but also a change in personnel. The Selecting, Using and Retaining stages are more likely to be undertaken by teaching or support staff with the resource used with or by learners. In contrast, the Obtaining, Labelling and Offering stages may not involve teaching staff, or learners. These stages can be led by educational technologists or information specialists, including repository managers and academic support staff. The audience for this activity is likely to be teaching and teaching support staff rather than learners or students.

At the time that Strijker (2004) suggested his 'cradle to grave' lifecycle for learning object reuse as part of his doctoral research, it was commonly suggested that the significant problem with reuse of resources related to finding the right kind of learning objects – with solutions to this addressed through technology. For example, Downes suggested that the reuse problems were of three types: *locating suitable learning resources* (to be addressed through better metadata); *learning objects portals not being integrated*, with restricted access to some sources necessitating a complex search over several systems (addressed through

interoperability improvements); and *inconsistency in the way that resources were produced*, making it difficult to reuse them without further modification/adaptation (addressed by creating resources as learning objects) (Downes, 2004b).

Strijker's research was, as he acknowledged, typical of the period in focusing on the way in which resources are created and offered, an emphasis reflecting the relative immaturity of learning object use and the lack of learning object utilization in practice. This emphasis could not contribute to understanding whether the effort employed in making resources reusable was justified and which part of the effort was most and least effective. Consideration of this gap is central to the research questions in this thesis.

1.7 Structure of the thesis

This thesis has, at its heart, the analysis of six cases directed at facilitation of reuse of digital online resources within higher education. Examination of these cases is preceded by wider macro- and meso-environmental reviews which informed case selection and interpretation of results. The structure of the remainder of the thesis is as follows:

Chapter 2 presents a broad analysis of the factors at macro-environment level, identifying relevant political, economic, social and technical factors impacting on the wider environment of UK HE in ways which were likely to influence resource reuse or its facilitation. This reflects the observation of Ferguson *et al.*, (2007) in considering why reuse in its anticipated form had not occurred yet: 'Behind the simple aspiration [reuse] is a complex web of interdependent issues; organisational, cultural, technical, legal and pedagogical.' (Ferguson *et al.*, 2007, p63)

Chapter 3 explores the mesoenvironmental level factors around reuse activity in UK HE. It identifies the key approaches that reuse initiatives over the period (including the six cases)

were engaged in, the implications of the differences and the evolution of key ideas related to resource reuse.

Chapters 2-3 together illustrate how the researched area has retained relevance to the sector throughout the research period, although new initiatives, such as the open content (open educational resources (OER)) movement emerged to replace earlier interest in RLO. As with RLO activity this open content originated outside the UK, notably with the launch of MIT's Open Courseware project pilots in September 2002 (BBC, 2002). However, since 2009, OER activity in UK HE has formed a significant part of funded reuse activity with £13.7m invested over three consecutive years (2009-2012). The JISC and Higher Education Academy (HEA) managed 29 OER individual, institutional, disciplinary and consortia projects during 2009-2010 alone, with funding provided by the Higher Education Funding Council for England (HEFCE).

These two chapters provide a longitudinal and analytical review of developments in higher education and e-learning in the UK, relevant to repositories, reuse and resource creation, aggregation and use over the period. They underpin interpretation of the case activity, as well as wider trends in reuse facilitation.

Chapter 4 sets out the methodological approach of the thesis, with particular focus on the selection for the cases and how they offer generalisability from a micro level to reflect wider activity in UK HE. Explanation of the selection of a qualitative case study approach within an interpretivist research paradigm tradition is also offered.

The approach taken in this thesis was to examine six contexts in which reuse could be expected to occur. Each case was chosen not only for its potential to address the research questions, but also to contribute to effective cross-case comparison. The analytic approach

was reflexive, with experiences from earlier cases informing the selection and direction of enquiry in later cases.

It is important to recognise this cross-exchange and cross-pollination of experience and ideology/experimentation around reuse of shared resources. This represents the co-operation and conflict between what Pegler (2011) described as the 'promise' and 'practice' of reuse activity. While the selection of cases was on the basis of examining distinctively different approaches to sharing and reuse, the cases themselves have features and ideals in common. Each actively operated within (drawing on and disseminating findings to) the wider UK resource reuse community. There is some inherent overlap of context, for example within those cases which relate to OU activity. There are also less obvious associations, which are identified and commented on.

Chapters 5 and 6 present the individual cases and analysis of these, with Chapter 5 focusing on the initial exploratory case, CS1-H806. The cases were to represent contexts under which reuse might be expected to occur, which were generalisable within the UK HE context and consistent with wider activity during the research period.

In each case, examples of resource reuse and/or facilitation were identified and analysed with explanation of unexpected variation. Each case commentary identifies and explores the significant themes connected to each case.

Chapter 7 presents a cross-case comparison contributing to a three-part classification (technical, quality and motivation) for the diverse factors identified. This provides an approach to considering the connection between the diverse factors noted in reuse and reuse facilitation. Factors of each classification type have the potential to influence on supply of, and

demand for, reusable online digital learning resources. Two over-arching modifiers are also introduced to explain key contextual differences observed in the case analysis.

Chapter 8 concludes the thesis, by relating the observations and analysis of reuse at the macro, meso and micro level to wider educational and educational technology activity. It also addresses how the six cases and the themes and factors observed in each of these address the three research questions. This conclusion also draws on more recent reuse research within UK HE (e.g. Masterman and Wild, 2011) and notes the relationship of this thesis to OER resource reuse research.

1.8 Timescale and coverage

Although the thesis draws on research literature, projects and examples from beyond the UK, and uses a case study based in Ireland, all examples have been selected for their relevance to understanding the experience of reuse in UK HE as further explored in Chapter 4.

The research period was sufficiently lengthy to allow a longitudinal multi-case study, covering early adoption and early maturity in digital online resource reuse practice. It commenced with considerable enthusiasm for, and confidence in, the potential of RLOs as a remedy to recognised resourcing problems affecting transition to online learning across HE. Still described as operating as a cottage industry (McLean, 2004), e-learning activity in HEIs had been consistently under-resourced. Translating conventional teaching resources into its online equivalents had been regarded as unproblematic and cost-saving, although research in the UK suggested that the costs of putting and supporting courses online, were higher than previously assumed (Bacsich (2001), Fielden (2002)). Learning objects were suggested as a component within this cost-saving approach, allowing many users to share the costs of producing high

quality, expensive, content (Downes, 2000). However RLOs had, before 2003, not been used in teaching practice in UK HE to any large extent.

During 2002 the incentive to engage with learning objects was pushed forward by the UKeUniversity (UKeU), which had commissioned three pilot courses made up of 'learning objects' for presentation to students in 2003. Using a bespoke, high-profile learning platform, the high-profile UKeU was a well-resourced (£55m) initiative aimed at supporting e-learning innovation and provision across the whole UK HE sector (Carusi *et al.*, 2004). Prior to the UKeU's intervention, learning objects and technically-facilitated reuse of online learning resources had been principally pioneered outside the UK, e.g. in Canada, where the Multimedia Educational Resource for Learning and Online Teaching (MERLOT <http://www.merlot.org>) was established in 1997. CS1-H806, as one of the UKeU's pilot courses, one of the first significant UK HE applications of RLOs within a formally accredited course with registered students.

The thesis end-point (April 2010) marks a significant shift towards open educational resources (OER) as a reuse facilitation approach. In January 2009 the Higher Education Funding Council of England (HEFCE), JISC and the Higher Education Academy (HEA) had launched the £5.6m pilot UKOER programme to investigate the use of OER across HE in England and Wales (JISC, 2008). Twenty-nine pilot projects involved staff from over 80 higher education institutions (HEIs) completed their activity in April 2010. Although, following cuts in HEFCE's budget, the original estimate of on-going OER funding was reduced, £4m was announced in April 2010 to fund a second phase for the OER programme. Within this a new strand, Open Materials for Accredited Courses (OMAC), led by the HEA, aimed to release reusable resources linked to the HEA's national professional standards framework for HE teaching staff. The UK OER

programme aimed to support and change teaching practice based on OER reuse.

In the period between these two initiatives (i.e. from UkeU to UKOER), the UK HE sector moved from regarding online education as a 'special case' activity, filtered through a new national e-university, to something that all universities and their staff could engage with. Expectations of online resource creation and reuse had shifted and by 2003 the original conception of an automated, or semi-automated, aggregation of learning objects to create personalised courses for students was already being questioned. David Wiley (Wiley, 2000b) emphasised that the instructional designer *must* stand as intermediary, which would necessarily disrupt automatic aggregation of personalised courses from reusable learning objects at any large scale. Dan Rehak, one of the architects of the SCORM interoperability standard for RLOs suggested that standard was inappropriate for university teaching. He pointed out that the HE student was not an isolated learner whose learning is self-paced and self-directed (the training context for which SCORM was derived) (Kraan and Wilson, 2002). Friesen drew attention to this reservation as one of objections to learning objects and e-learning standards (Friesen, 2004). Scepticism about automatic aggregation of teaching and learning content led to increasing interest in learning design (LD) (e.g. Koper and Manderveld, 2004). The development of LD players for learning objects offered semi-automated delivery of RLOs more suited to higher education. As one model lost impetus other models emerged. These shifts in emphasis are explored more fully in Chapter 3.

Reuse examples are, in 2012, no longer centred on creating exceptionally high quality multimedia learning objects to be used without adaptation by hundreds of users globally (Downes, 2000). The new reuse focus is on an 'open' system, less restrictive and more social in practice, directed towards sharing resources which may be created and disseminated relatively informally. The emergence and development of communities of practice around reuse of

resources (Wenger, 1998) attracted attention as part of reuse (e.g. Margaryan *et al.*, 2006), reflecting increased use of social media for education. Mesoenvironmental theory around resource reuse has evolved in a continuous, cumulative way. OER activity has its roots in RLO experience, involving many of the same researchers. Wiley, who is credited with creating the term 'open content' described open educational resources as 'reusable learning objects with an open license' (Wiley and Downes, 2009), recognizing the legacy within the newer model.

Chapter 2: Placing resource reuse in a broader context

2.1 Introduction

Reuse and repurposing of resources is not usually an end in itself. It is part of the process of offering higher education in the UK, and needs to work with other aspects of that process, within a specific learning and teaching context. The provision and support of education does not take place in a vacuum, although the culture of education is one which often relies upon the activity of individual academics working in independent fashion (Malcolm, 2005). This chapter considers how reuse and repurposing of digital resources was influenced by the wider objectives established for UK HE during the first decade of the 21st century.

Chapter 3 will identify specific issues arising from research and practice which are directed at reuse activity. However, in order to understand why there was wide interest and considerable investment in pursuing the 'Holy Grail' of digital learning resource reuse, it is first necessary to identify relevant factors within the wider macro environment, and understand how these shaped the sector. A longitudinal overview at a macroenvironmental level is necessarily complex because of the range of factors to be considered and the change in these over time. The period examined in this thesis also covers one where there was substantial shift in the UK HE sector, and in the level and type of access to the internet for learning and teaching.

This chapter considers relevant political, economic, societal, and technical/legal issues affecting UK higher education during, immediately prior to and at the close of the research period. It addresses the place of re-use of digital resources within a wider portfolio of activity across UK higher education.

2.2 What was driving the search for reuse?

The questions that this chapter particularly seeks to address are: What were the drivers for the sustained effort to enhance and expand reuse of digital online resources in UK HE?; Why did some reuse initiatives attract governmental, endowment, institutional or departmental support, and what implications did this have?

There has been considerable interest and support for extending reuse of digital resources evidenced through on-going investment of significant funding in reuse activity in HE. For example, during 2005-2007 JISC funded 24 projects as part of its Digital Repositories programme, CS5-PROWE was one of these. That programme followed and was succeeded by other programmes aimed at facilitating dissemination and sharing of resources online. The announcement in May 2011 of a £4m investment for a third stage of the JISC/HEA OER programme occurred despite budgetary constraints elsewhere in the sector. Support has included incentives to create, adapt and circulate reusable resources to 'seed' reuse in practice, develop appropriate infrastructure within HEIs, and consult nationally and internationally on reuse practice around metadata schemas, interoperability standards and institutional and national repository development. This represented considerable effort to achieve a new form of reuse beyond the past models of educational reuse noted in Chapter 1

Writing at the start of the research period, Weller, commented that reuse is not a *new* objective, but it has remained elusive in practice:

the idea of material reuse has been around for a long time, and yet it still has not really had any impact on course development. It represents something of a holy grail in e-learning, and there is no doubt that the technology now makes it very much more tangible grail. Whether it is achieved will depend largely on the efforts of educators and institutions to make it a reality. This will be one of the most significant areas to watch

over the next few years, since it could radically alter how online courses are developed and who develops them. (Weller, 2002), p171)

This reuse was to be technically facilitated as Weller was talking here about RLOs. The use of the Holy Grail as a metaphor for reuse had occurred earlier, to describe reuse of programming objects (Metros and Bennett, 2002), one of the influences in developing RLOs. Ferguson, Jacobs, Kernohan and Schmoller later used this term to describe reuse and open educational resources:

It is a holy grail of e-learning content, that all media assets, information, learning objects, and learning activities, or learning designs, should be made once and used in learning many times, either unchanged or modified. Behind the simple aspiration is a complex web of interdependent issues; organisational, cultural, technical, legal and pedagogical. Ferguson *et al.*, (2007, p63)

To understand why there has been considerable and sustained interest, activity and investment in pursuing the reusable resource 'Holy Grail', and why it has been considered so worthy of investment, it is necessary to understand the contemporaneous UK HE *macroenvironment* from which this demand for additional reuse grew. This was the wider environment in which Weller's 'educators and institutions' operated. Influences at this level directly, and indirectly, influenced the type, timing and direction of activity aimed at achieving or facilitating reuse/repurposing.

Conditions within the wider environment (e.g. funding sources and directives) influenced formal reuse and repository activity (e.g. development of priorities and operating principles for new and newly digitised collections and establishment of repositories). This represented an extension of the *scope* of previous reuse, shifts in format *and* access. To a large extent growth

in teaching and learning collections and repositories mirrored changes in access to research, where collections were moving online. Using the internet was becoming more common and some of the same repository systems have been used for both teaching and research purposes (e.g. EPrints and intraLibrary). However, while sharing and citing of research were well-established forms of reuse in HE, the emphasis on sharing and reuse of educational resources inter-institutionally was new. This activity was also newly relevant within HE.

2.3 Macroenvironmental PEST analysis

To ensure a comprehensive and ordered identification of factors, this overview uses a Political, Economic, Social and Technical (PEST) factor analysis approach. The PEST model also variously known by the acronym STEP and EPTS (its earliest form, Aguilar, 1967), is sometimes expanded to PESTLE by separating out Legal and Environmental factors. Within this thesis, legal factors are included in discussion of technical factors (see Chapter 7 for a further explanation). Environmental factors are considered in the discussion of Social factors (Section 2.6).

PEST analysis offers a structured and inclusive approach to identifying relevant influences. It is an established approach to environmental analysis within management science and business practice (e.g. Gillespie, 2007), particularly useful where it is necessary to identify external influences.

2.4 Political drivers/barriers and the climate for reuse

Within UK HE, politics is a significant driver of activity, particularly at the institutional level, because universities have been heavily reliant upon government grants to cover the costs of teaching activity. For many HEIs central government grants tied to *teaching*, represented a large and relatively predictable source of income, in comparison with other sources, such as

research grants. This has made individual UK HEIs particularly sensitive to changes in emphasis in national education policy, particularly those related to how learning and teaching activity is measured and funded. The Browne Review (Browne, 2010) has informed proposals for radical changes in HE aimed at influencing the way universities are funded and the range of students they teach. However, the previous decade had already been one which marked continued change in both these respects.

2.4.1 Tensions between ‘massification’ and higher quality

Access to higher education in the UK has expanded substantially in the last 30 years. This growth is part of a sustained trend in which the number of young people entering university almost doubled between the late 1980s and early 1990s (HEFCE, 2005). By the start of the research period 44% of the 18-30 year age group were entering higher education, compared to 12 percent of 18 to 21 year-olds in 1980 (DfES, 2004). In 1999, speaking as UK Prime Minister at his Party Conference, Tony Blair emphasised his government’s aspiration for wider access to higher education: ‘today I set a target of 50 per cent of young adults going into higher education in the next century’ (Blair, 1999).

This target required significant change within UK HE and proved impossible to achieve within existing systems. New universities were created, while existing universities expanded capacity. This scaling up of teaching and learning activity was necessary to meet the demands of what has been described as ‘mass higher education’ (Mayhew *et al.*, 2004). At the same time there was a political drive to make measures of teaching quality public. In HE this was notably through the annual National Student Survey (NSS). Introduced in 2005, the NSS used ‘quality of learning resources’ as one of seven quality measures (HEFCE, 2006). This highlighted the significance of educational resources within UK HE.

Moving towards online or blended e-learning activity, is one way in which UK HE has tried to reconcile the new demands of increased capacity and improved quality of resources, without increasing costs disproportionately. A frequently-cited advantage has been the potential to increase learner numbers cost-effectively, in part through sharing resources. Epic, a commercial elearning company working with educational and corporate clients, using the language of business and balance sheets, has suggested this was part of the Return on Investment (ROI) of e-learning (Epic, 2010).

The more optimistic of the claims regarding online education and cost reduction have been challenged (Bacsich *et al.*, 1999, Weller, 2004), however online education does offer a relatively quick route to increasing capacity of the teaching 'space' and is less expensive than increasing lecture hall and seminar room capacity. One of the largest hurdles to moving into online delivery was the preparedness of the universities, and in particular the staff, to develop new courses online. Littlejohn and Campbell (2002) noted from the Scottish TALiSMAN (Teaching and Learning in Scottish Metropolitan Area Networks) scoping study (Alexander, 1999) that 90% of HEIs saw a need for staff development in computing and information technology skills relevant to teaching, learning and assessment. Reskilling could, they suggested, be achieved through reuse: 'The study concluded that the reuse and sharing of materials could promote the distribution of expertise across institutions, thereby enabling smaller institutions to access a wider pool of resources' (Littlejohn and Campbell, 2002).

An advantage of reusing digital online resources within staff development was that they offered examples of how to design online teaching which could then inform educators about online or blended elearning practice, as well as filling gaps in online skills provision. The idea of open practice, as advocated by Conole (2010b), builds on this ideal of sharing practice through sharing of resources.

Even where institutions had online capability, or were able to procure this, being able to reuse resources created elsewhere was, at least theoretically, an attractive prospect. Reusing resources more extensively than previously offered a route to conserving teaching staff time and technical support during a period when rapid growth stretched both. From management and HE funder perspectives, reuse presented an attractive approach to making best use of online resources (staff, content and tools) which were in short supply within HE during a period when there was particularly high demand for such resources.

2.4.2 Diversity, lifelong learning and personalised learning

The scaling-up by UK HEIs to support increasing numbers of students presented a challenge for the sector in terms of the diversity as well as the quantity of students. With massification of HE the proportion of students entering higher education from conventional educational backgrounds declined. Universities needed to attract and retain students from a wider range of educational and cultural backgrounds. To achieve this HEIs introduced an increased variety and number of courses, as well as new access arrangements for existing courses (e.g. through part-time and distance or online courses). This diversification has led to new challenges in teaching and support for even established universities.

There was also an increasingly large body of international students within UK higher education. In 2000/01 over 126,000 non-European Union students studied at UK universities and by 2008/9 this had almost doubled to 251,310 (UKCISA, 2010). While these students generated valuable additional income, they also required additional resources to prepare them a study in the UK. This is only one example of the implications of growing diversity of students in UK HE in the 21st century. Disabled students, those combining work-based learning with their higher education, and those who were studying in unconventional locations such as prisons, also made up a larger proportion of HE students than previously. These special requirements

presented challenges for conventional course delivery. For example, some mature students using HE to equip them for a career change, required accreditation of prior experiential learning (APEL) and course customisation to conform with the accreditation of professional bodies to which they belonged. Higher education policy had pushed institutions towards an increased volume of students, with a high degree of differentiation, and also subjected HEIs to a greater level of quality inspection.

Online customization or personalization of courses and associated support, has been suggested as an effective solution to this dilemma. This approach would allow students to select routes, resources and tools within a course based on their individual preferences or requirements. Personalisation is a flexible student-centred learning approach that has been commended by the UK HE funding body HEFCE (HEFCE 2005, updated in 2009). In 2006, David Miliband, as Minister of State schools standards, (Miliband, 2006) pointed out the benefits, including its key significance in meeting the needs of a diverse student population where current education had been shown to not offer sufficient curriculum choice or student-centredness: '[the] One size fits all approach to education puts brakes on the progress of too many students.' (Miliband, 2006, p108)

The terms customization and personalization are sometimes used synonymously in elearning.

In this thesis personalisation refers to the *automatic* selection on behalf of the learners of resources to create a learner-centred course, perhaps based on results of assessment.

Customisation relates to the settings or preferences selected by learners (e.g. their choice between options). Both require that there be alternative educational resources available that learners can use, sometimes with freedom to choose the sequencing of these. To allow cost-effective choice in sequencing requires reusability in the design of the resource, so that it is capable of reuse within a variety of contexts within the same course. Personalisation without

reuse of resources represented a considerable new cost for HEIs. For example, Figueira and Kaufman (2008) noted the 'extreme cost' of producing high-quality digital educational content for web-based instruction to meet individual students' needs.

Reusing, including adapting, digital online resources shares the cost of producing alternatives, across a larger number of students, courses and institutions, while increasing the variety of options available. As Oliver and McLoughlin (2003) suggested: 'one of the major goals of course reuse is to support course customisation, i.e. producing several versions of the same course targeted to different audiences from the same set of learning objects.' (Oliver and McLoughlin, 2003, p95)

Part of the rationale for Case Study 4: SORRS (CS4-SORRS) was the need to deliver 'nation-specific' resources to UK students. With devolution, it became necessary for students studying within Scotland, Wales, Northern Ireland and England to refer to resources relevant to the law and practice in their nation. Students were otherwise studying the same module and part of the same UK-wide online student cohort.

Reflecting its push towards reuse in service of HE policy, HEFCE strategy (HEFCE 2005) set out reuse-related objectives within its learning resources and networked learning strand (Strand 2). HEFCE suggesting that the sector:

2.1: Develop a comprehensive and coherent approach to the development and use of resources for learning and teaching, including digital resources and discovery tools [to allow location of resources to reuse] (HEFCE, 2005, p9)

2.2: Enhance the quality of digital resources and tools for learners provided by JISC, and sources for teaching, learning, research and innovation', with specific mention of JORUM and X4L projects (op cit, p9)

2.3: Promote the sharing of learning technology and resources across the HE sector and between sectors ... (op cit, p10)

Resources which are interchangeable and standalone, suitable for a variety of educational contexts are particularly attractive as a route to offering personalization and thus meeting the challenge of diversity in higher education. Digital online resources, in particular learning objects, meet this brief.

2.4.3 New disability discrimination requirements

During the research period significant legislation came into force which had impact on the legal requirement of HEIs to meet the needs of disabled students, leading to changes in universities' policy and practice when teaching and supporting these students.

The UK's Disability Discrimination Act (DDA Part 4) came into effect during 2006, but the associated Disability Equality Duty, was anticipated within UK HE for several years before the new law took effect. From 2006 UK HEIs were required to be accessible within reason to disabled students and staff. While this had impact on physical access to buildings, and other campus infrastructure, what concerns this thesis is the impact on making learning resources accessible to students with a range of disabilities. The legislation put emphasis on *anticipating* accessibility needs, i.e. designing accessibility in, rather than responding retrospectively to requests for access. Educators and their institutions were therefore required to consider accessibility when designing or selecting resources for student use. However, designing in

accessibility required knowledge and skill, particularly with regard to digital online resource design, which was a new area of expertise. As has already been noted (Littlejohn and Campbell 2002) many HE staff were lacking skills in designing online courses. The new requirement to design accessible resources added a further level of complexity.

The problem was compounded as disabled students and disabled staff (also covered in this legislation) are diverse in the type of disability and also which assistive measures can help them. For example, a dyslexic student requires different support to one with restricted movement. Ideally resources would be compatible with a range of assistive measures, as students with the same disability may have specific preferences in addressing impairment (e.g. partially sighted students may use screen readers *or* screen magnification *or* large print).

Personalization and customization are therefore particularly desirable approaches to address diverse disability requirements, allowing for variation in student preferences. With a variety of alternative resources available, the student can select the one which best suits their needs.

Case Study 2: Stòr Cùram (CS2-Stòr) used expert developers and a robust development model to offer accessible multimedia learning objects through a national repository.

2.4.4 Policy influences and the politics of reuse

Policies published by HEFCE and by the Department for Education and Skills (DfES) during the research period consistently offered encouragement to HEIs to reuse resources as one of the most viable approaches to engaging with online learning. There was significant funding activity and attention centred on reusable learning objects generated by the national UKeUniversity during the early part of the research period (2001-2004) (Bacsich, 2005). By 2010 government-funded initiatives centred on supporting OER activity (e.g. JISC 2008) required sharing of

resources to occur in formats aimed at increasing use and reuse of online learning and teaching resources.

HEFCE's commitment to funding a substantial OER programme mirrored interest elsewhere. In early 2011, the US government, also facing financial challenges, announced a \$2billion, four year grant programme through the Trade Adjustment Assistance Community College and Career Training (TAACCCT) which required sharing in reusable form of courses and materials produced under this funding:

All successful applicants that propose online and technology-enabled learning projects will develop materials in compliance with SCORM, as referenced in Section I.B.4 of this SGA. These courses and materials will be made available to the Department for free public use and distribution, including the ability to re-use course modules, via an online repository for learning materials to be established by the Federal Government. (US Department of Labor, 2011, pp4-5).

Within UK HE, one barrier to progress in sharing of educational resources has been the lack of a single sector-wide curriculum for university teaching. Within UK primary and secondary education, and within some tertiary education initiatives where courses are externally accredited, there is a common national syllabus. This creates a high level of predictability in terms of the resource's learning objectives regardless of source. It creates an identifiable market for which reusable educational resources can be created. For example, guides for GCSE subjects from commercial publishers are commonly used within schools to teach these subjects as they precisely address the teaching requirements of the course. In the US the 'common core' for teaching K-12 has been a factor in supporting open textbook development (Wiley and Hilton, 2011).

A common syllabus also assists in description and discovery of resources. For example a description of reusable resources for English at Key Stage 1, or AQA Exam Board GCSE in Electronics can be easily understood. This facilitates identification and exchange of resources between different users. Within very large institutions where there are many teachers of the same course (e.g. the UK Open University where hundreds of tutors may be teaching the same course concurrently) a course code can serve the same purpose (see Section 6.2.6).

In the UK a core curriculum provides a national outline of the teaching coverage required in schools, but there is no equivalent limit to conventional university teaching. There has been speculation that this could change with teaching-only institutions and a common curriculum established (Barnett, 2008). In mid-2010 David Willetts, in one of his first speeches as Minister of State for Universities and Science for the coalition government championed teaching-only institutions (Willetts, 2010). He further suggested that external degree models of university teaching should be explored. Significant diversity in university teaching at present arises from the connection of teaching to the research interests of the academic. In external degree models the curriculum would be set centrally, with many teachers supporting the same plan, and in teaching-only institutions there would be more likelihood of a less divergent curriculum emerging, because of the separation of teaching from individual academic research interests. Neither have become policy, but suggest how future changes could make the teaching environment in UK HE more favourable to resource reuse. Academics may view these changes as a curb on their individual freedom to determine what they teach (Barnett, 2008). McGrath, an early advocate of learning object reuse pointed out when talking about the OER movement that political encouragement was insufficient to create and sustain change: 'White papers and manifestoes alone will not sustain an open education movement' (McGrath, 2008, p14).

2.4.5 Changes in teaching practices

The decade during which this research occurred also saw significant national and discipline-based, centrally-funded activity, directed at supporting e-learning and other new pedagogic approaches. There were several high profile initiatives directed at changing practice in ways which prepared academics to use and reuse digital online resources. For example from 2005-2010 HEFCE funded 25 Centres of Excellence in Teaching and Learning (CETL). Each cited e-learning as a 'pedagogic interest' (Beaty, 2006) and several had direct involvement in creating reusable learning objects. Most notably, the RLO-CETL (Reusable Learning Object CETL), received £3m to initiate and support development and use of learning objects (particularly reusable forms of digital learning resource). Other CETLs used learning objects as a versatile format for dissemination of their outputs. For example, the Centre for Inter-Professional E-Learning (CiPEL CETL), a CETL with cross-disciplinary interests, created a repository of learning objects to facilitate sharing of practice examples (Bloom et. al., 2008).

2.5 Economic drivers/barriers and the climate for reuse

Section 2.4 identified examples of political (policy) support of reuse of digital resources and offered reasons why this activity was a politically desirable objective. This section considers economic drivers and why reuse continued to be favoured activity, at least from the perspective of the funding bodies, during times of budgetary constraint.

At the start of the research period, plans to create resources that others could easily reuse often presumed some form of economic 'payback' would be necessary to act as incentive to share. There was an assumption that reusable learning objects, particularly those which were scarce, or high quality, could be traded or sold. Alternatively the development costs could be offset through collaboration and resource sharing restricted to this group. This confidence in

the earning potential of RLOs eroded as the period progressed, influenced by greater availability of free content through Web 2.0 activity and the onset of the OER (sometimes called open content) movement. By the time MIT made available 900 free courses in 2004 (<http://ocw.mit.edu/about/our-history/>) perceptions about the value of educational resources as a tradable commodity had shifted.

This was a gradual change, and its effects were uneven in terms of the influence on individuals and institutions. Throughout the research period, not 'giving away' valuable resources to others, without prospect of economic reward was cited by practitioners as a reason for not sharing educational resources, or not making them easy to reuse (e.g. Strunz, 2011). So important was this consideration that some of the earlier arguments underpinning learning objects suggested that there would be a 'learning object economy' where better quality, and more popular/rare resources would attract financial reward through reuse (Johnson, 2003). The MERLOT repository, an initiative that went on to share content free-of-charge was initially seen as having the potential to offer paid-for services:

MERLOT hopes to turn itself into a revenue-producing resource for faculty members who create and use online teaching materials. Eventually it hopes to attract corporate sponsorship. (Feemster, 2000, p2)

Johnson (2003), reporting on a meeting of experts addressing the challenges of creating a learning object economy, noted that a free and open learning object economy, such as might emerge in the education sector, could create problems of unequal quality (something that MERLOT sought to address through peer review). He quoted Elliot Masie, one of the participants in the meeting, as saying:

The issues with the learning object economy are content, content, and content. Unless we create an economy of content in which individuals and organizations can acquire, adapt, and repurpose content, the industry won't be successful. (Johnson, 2003, p7)

This confidence in the value of 'content' was the prevailing view at the start of the research period. Trends in education have more recently moved to emphasis an exchange of digital teaching resources which are free-to-end-user (learner or educator). New models suggest that the accreditation and support of courses will attract costs while content is free. The same resource may therefore be used in a taught course or accredited qualification with students paying fees, while the resource is freely available to other unregistered learners (e.g. Aczel *et al.*, 2011). Whether open education can develop into a financially sustainable model, using this 'freemium' approach, is not yet clear.

2.5.1 The rationale for investment in reuse

When creating resources for UK HE teaching there is usually no requirement to make these suitable for use by others. The creator of a resource for use with students is likely to be the only person who will use that resource. They are creating something which suits their teaching style and context rather than developing something which may be useful to and useable by others. The main exception is within large scale distance teaching institutions such as the UK Open University (OU). There course design (including the creation of resources) is undertaken by a central course production team in expectation that the resources created will be used by OU part-time tutors to teach students (see Section 7.3.1 for further discussion of this).

This distinction is significant, as making a resource suitable for others to reuse will usually require some additional investment of time in checking and reformatting the resource. There may be issues about the vocabulary used, technical interoperability, a need to clear third party

rights for a wider audience. In addition, before sharing a resource identified as their work the teacher may want to conduct quality checks and corrections. If the resource is to be shared formally in an online collection or repository, metadata must be added to assist categorization and discovery. There may be a transfer into a new system.

These aspects of reuse create additional costs for the supplier of the resource, with higher costs the more complex the sharing requirements, even where there is no charge attached to the resource itself. Institutions and individuals on which these additional costs fall will require an incentive to contribute that additional effort or investment. During the early part of the research period, pre-dating the release of substantial open content by MIT in 2004, the motivation to create reusable resources was linked to receipt of project funding, prospect of economic return on investment, or potential to cut future costs of resource production. MIT's own work was supported by a large endowment from the Hewlett Foundation. More recent initiatives, such as uNow based at Nottingham University (Beggan, 2010) and the OU OpenLearn OER initiative (Lane, 2009) have provided evidence of a model based on institutional investment geared to showcasing teaching excellence. The costs could be considered as marketing costs and offset by enhancing the HEI's reputation, or attracting new students.

Large scale governmental investment and charitable endowments have underwritten the costs of making content available in reusable form for free. Previously many reusable resources had previously remained locked into institutional systems and behind password protection as noted by Christiansen and Anderson (2004) when they attempted to access resources for course construction. One irony of the investment in resources for wider use is that many resources are still not easily visible and reusable *within* institutions. Teaching staff may find it easier to locate this content by searching outside their HEI than within it (Pegler, 2010). Seed

funding for content sharing underwritten by grants has often been viewed as a transitional stage, with a 'tipping point' that would be reached once there was sufficient critical mass of quality content, and once the sharing of resources had been shown to be beneficial. From this point users would be expected to change their established behaviour without an economic incentive to do this. Funders of UK HEI activity have consistently made clear that they do not expect to continuously finance creation of content, or the process of making that content available in reusable form online (e.g. 'Projects will draw on the findings of the pilot phase to support their work and will work towards achieving sustainable practice as funding from this call (06/10) ceases' (JISC, 2010, p4)).

2.5.2 Reusable learning objects at \$1 or \$1000

Downes (2001) made an apparently compelling economic argument for investing in reusing learning objects which recognised the high cost of creating and making available good quality educational content suitable for reuse by others. His ideal was predicated on widespread adoption of learning objects:

Now for the premise: the world does not need thousands of similar descriptions of sine wave functions available online. Rather, what the world needs is one, or maybe a dozen at most, descriptions of sine wave functions available online. The reasons are manifest. If some educational content, such as a description of sine wave functions, is available online, then it is available worldwide. Even if only one such piece of educational content were created, it could be accessed by each of the thousands of educational institutions teaching the same material. Moreover, educational content is not inexpensive to produce. Even a plain webpage, authored by a mathematics professor, can cost hundreds of dollars. Include graphics and a little animation and the price is double. Add an interactive exercise and the price is quadrupled.

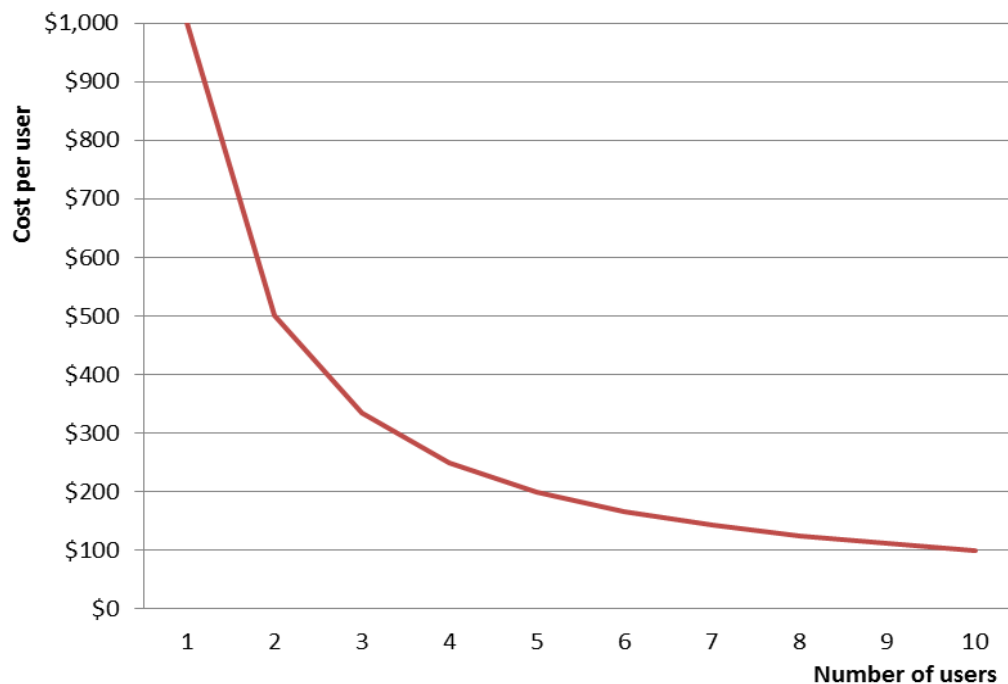
Suppose that just one description of the sine wave function is produced. A high quality and fully interactive piece of learning material could be produced for, perhaps, a thousand dollars. If one thousand institutions share this one item, the cost is \$1 per institution. But if each of a 1000 institutions produces a similar item, then each institution must pay \$1000 with a resulting total expenditure of \$1,000,000. For one lesson. In one course. (Downes, 2001)

This example, perhaps intentionally, is extremely simple and apparently unproblematic. Its realism and relevance are however open to question. Downes takes no accounts of the costs in collaboration around the resource creation. His illustration is effective in revealing the prevailing understanding of the economics around reuse of learning objects (and other digital resources). It identifies reuse with a model which makes sense when large scale (massively multi-user) sharing occurs, behaviour which has not previously existed. The attractiveness of massive multi-user sharing of open resources persists in the model of the Massively Open Online Course model championed by George Siemens and Stephen Downes (Mackness *et al.*, 2010), although the emphasis on reuse of learning resources there is skewed towards user-created (or user-selected) free-of-charge content and activity, augmenting the open resources chosen by the course creators.

It is significant that sharing of reusable learning objects was initially presented as an approach which had *economic* benefits for many users. Downes was criticizing, given the very high costs of digital resource production, the way in which use of expensive resources was limited to a single context, which he called 'silo' production (Downes, 2002). He suggested financial benefits both through cost reduction and income generation, grounded in his assumption of a mass distribution model. Perhaps unsurprisingly the emphasis and excitement of RLOs was in sharing with others who would not otherwise have accessed or even been aware of the

resource. Local sharing (colleague-to-colleague, or within department, institution, regional or discipline community) and reuse of one's own content already existed. These did not attract the same attention as Downes' example. Ironically, as Figure 2.1 shows, the largest contribution to cost reduction occurs with the first few additional users.

Figure 2.1: Costs of resource production relative to users



No. of users	1	2	3	4	5	6	7	8	9	10
Cost per user	\$1,000	\$500	\$333	\$250	\$200	\$167	\$143	\$125	\$111	\$100
Saving per user	\$0	\$500	\$667	\$750	\$800	\$833	\$857	\$875	\$889	\$900
Cost reduction/ user	\$0	\$500	\$167	\$83	\$50	\$33	\$24	\$18	\$14	\$11

When production is shared between two users the costs can be as low as 50% of what they would have spent independently. The resulting resource can be improved by a process of peer review and the costs of the collaboration would be relatively modest. The greater the number of collaborators, the higher the costs of the collaboration in total, and the more unlikely that

agreement on design, and other aspects of resource production can be reached. As Figure 2.1 shows, local sharing can be more economically beneficial *per user*, as well as easier to achieve, than the wide ranging sharing of Downes' illustration.

Downes' example implied that there will be benefit to hundreds of institutions. However his example also assumed potential users had no suitable resource available to teach sine wave function and would be happy to incur the costs of adopting a new resource in whose creation they had played no part. He does not take account of any costs in evaluating the new resource, becoming acquainted with it, or adapting teaching to incorporate it.

What is common to the conceptions of reuse economics illustrated by Downes (2001) and Figure 2.1 is that the cost of sharing reduces to a point at which the consequences of sharing more widely are not economically productive. In Downes' model, \$1 per user is perhaps not worth the effort to collect. As Figure 2.1 illustrates, once six users have shared the costs of producing a \$1000 resource, the additional benefit they will each achieve in terms of reductions to their own portion of the charge declines to less than \$10. By the time 21 users are sharing costs each additional user brings \$2 or less in savings to other users. The administrative cost of attracting additional users at this point is unlikely to make charging for reuse economically attractive. It may make as much sense to make the resource available for free at this stage.

Within the UK similar views to those expressed by Downes (2001) were also being expressed,

For widely used content that involves a lot of multimedia development, the [learning object] model makes a lot of sense. The high upfront development costs and risks are borne by the developer who, in an ideal, interoperable world, can get their money back by charging lots of people relatively little. ... Where the model will

not work so well is in highly specialised contexts, or situations where content needs to be updated very regularly. Economic realities also mean that not every institution will be able to buy in with their content, or even need slick animation and video in every learning object. (Kraan, 2002)

Two years on from Downes' observation, this assumes that asking large numbers of people for a small contribution each is a viable economic model, but emphasizes that this is based on expensive-to-produce multimedia resources rather than *any* educational resource.

The illustration presented by Downes, Kraan and others, was one of benefitting large numbers of educational users and saving considerable cost. This may have helped to attract the political support and interest that learning objects initially received. Kraan mentions 'multimedia development', basing his example on notably expensive forms of learning resource, presumably because the benefits of cost sharing were more obvious. Reuse of this type of learning resource was also emphasised in the work of the UK RLO-CETL and is evident in the title of the first large international learning and teaching repository, MERLOT (Multimedia Educational Resource for Learning and Online Teaching). This contrasts with text-based resources, which could be produced locally for costs near to the price which creators might charge for reuse. As the period progressed user-generated audio and video online resources also became more commonplace.

2.5.3 Demonstrating sustainability for publicly-funded content

Public investment in creating educational resources has been on-going for decades, through individual projects and programmes. While the institution or project receiving funding may benefit directly from the investment, there has not, until more recently, been an automatic requirement to share educational resource outputs in *reusable* form. Highly effective

resources may become obsolescent at the end of a project, and the resources may become unusable without on-going investment in technical migration, requiring additional funding to make them available again (e.g. Barker *et al.*, 2004, Milne, 2010).

An understandable emphasis on sharing resources more effectively has, during the research period, attached to outcomes from government-funded projects. For example, from 2004 JISC-funded projects have been required to publish into Jorum the UK's national repository for educators in HE/FE (Eales, 2003). Although practice is changing there remains the problem of legacy material, which may not have been released for reuse, or material where reuse is constrained in some way. The 2009/10 HEFCE-funded UKOER projects were asked to share under open licenses which permitted derivatives (i.e. repurposing) as a *default* as this was expected to facilitate reuse by other educators (Kernohan, 2010). This followed previous JISC-funded reuse projects experiencing difficulties in obtaining rights clearance. IPR had been identified as having critical impact on the success of the 20 JISC RePRODUCE projects (45% reported problems and only 14% found it easy to clear rights from other UK universities (Earney, 2009).

Emphasis is now often placed on publishing publicly-funded resources using open licenses where possible, for example in JorumOpen (the open repository element within Jorum), so that these resources can more easily be taken up and used beyond the project. Projects aiming to generate resources are routinely asked to demonstrate sustainability when bidding for funding or reporting on project activity. Sharing resources beyond the life of the project, ideally in reusable form, demonstrates an effective economic model for reuse. Without this, the rationale for public funding of reuse facilitation or content creation becomes less clear.

2.5.4 Making free content/Making content free

When MIT started to make content from its courses available online, it raised questions about where the value of university teaching lay. MIT President Charles M. Vest placed emphasis on the value of teaching support rather than teaching content:

Let me be clear: We are not providing an MIT education on the Web. We are providing our core materials that are the infrastructure that undergirds an MIT education. Real education requires interaction, the interaction that is part of American teaching. (Vest, 2001)

These were views which contrasted with the usual assumptions about the value inherent in educational content and the potential for resale as part of reuse.

The OU expected from 2010/11 onwards, as part of its OpenLearn OER activity, to be able to produce and publish the open content version of resources at marginal cost, as an automatic by-product of its production process. The open content and resources for registered students would be produced as part of a single 'structured authoring' process. Andy Lane, Director of OpenLearn (Lane, 2009) estimated that the cost of OU material was £3000 per hour of student study time, pointing out that OpenLearn versions suitable for reuse could be made available at 10% of this cost. He further estimated that once automated the additional cost would be 10% of that (i.e. 1% of the cost, or £30 per study hour). As the OU has evidence that publishing course material in OpenLearn is an effective form of attracting students, or showcasing to prospective students (McAndrew and Lane, 2010), on-going investment in sharing its resources in OpenLearn makes sense as a marketing strategy. There is an economically sustainable argument for the OU to continue to publish reusable resources as OER. This has been an important argument in favour of sustainability for OER, as work at both MIT and the OU in setting up their OER activities was started with substantial funding from the William and Flora

Hewlett Foundation, as part of a global \$80m investment in open content (McAndrew and Lane, 2010).

In making learning resources open, both the OpenLearn initiative, and MIT through its recorded lectures, principally support learning rather than teaching. Both initiatives provide material in a form (open courseware) where it can be used autonomously, without a tutor being available. The OU had additionally provided Labspace (<http://labspace.open.ac.uk>) versions of its OpenLearn resources as XML files for educators to remix and repurpose. Although there is no obvious economic rationale for this part of the OU OER activity in terms of attracting students, it has underpinned OER research activity at the institution.

The cost, time and expertise required to produce online educational content, including multimedia, has declined significantly over the research period. Inexpensive digital recording devices and free editing software supported direct upload to YouTube while simple editing online became possible without additional hardware, software or support costs. Teaching activity, e.g. by publishing PowerPoint presentations to SlideShare with an audio recording of the session synchronised to the presentation could be created by academics without additional costs or technical assistance. Resources created using personal tools such as digital cameras were increasingly disseminated using non-University websites and tools. The supply and diversity of sources increased hugely, with shareable multimedia often resulted from individual rather than institutional effort. Content created and shared in this way was also generated by students as a by-product of their learning activity.

Not all content shared freely is suited for reuse in HE. As Johnson (2003) pointed out in the Macromedia white paper on the Learning Object Economy, there has often been significant variety in the content made available for free and online. Even where the production quality is

good the content may not be appropriate in style, or in accuracy. It may not be available in a persistent or robust form. Free resources may require so much repurposing work that they offer no economic advantage over starting from scratch and creating new content. This is not to suggest that less formal resources have no value in HE. Weller (2010) has suggested that shareable resources of both high and low finish quality have value in his discussion of 'big and little OER'.

2.5.5 The impact of project activity

Project funding has had, and continues to have, a significant impact on learning resource reuse activity. During the research period, JISC has administered the most significant and sustained funding for reuse-related projects across the sector. While other UK-based organisations such as Eduserv (<http://www.eduserv.org.uk/>) have also funded UK HEI projects connected to the reuse of digital content and development of learning, this funding has been smaller scale and usually occurred within a tighter time frame, in the case of Eduserv this was 2005-2006 (showcased at the Eduserv 2005 Annual Conference *Many for many: Collaborative e-Resource Development and Use*). Other project investment has also been funded within institutions, or through international grants or endowments.

Projects have not only undertaken production and release of reusable digital resources, but have also developed technology and systems to support sharing. Examples include, work on digitization and curation of existing resources, input to learning design and metadata approaches, providing legal advice and developing repository systems such as Jorum.

Many of the UK-based events which showcased best reuse practice, and encouraged discussion around sharing resources, were funded and managed by JISC. So, as well as funding specific projects, JISC activity has also informed wider UK discussion around reusable resource

creation, discovery and dissemination. JISC has also taken a lead in presenting a view to UK government of a higher education sector which views open sharing of resources as a central activity. Cooke, then Chair of the JISC, in his briefing to John Denham (then Minister of State for Education), identified one of the three main objectives for higher education as:

a new approach to virtual education based on a corpus of open learning content: the UK must have a core of open access learning resources organised in a coherent way to support online and blended learning by all higher education institutions and to make it more widely available in non-HEA environments. (Cooke, 2008, p3)

Three of the cases examined in this thesis were funded wholly or partly through JISC, while other cases benefitted less directly from JISC project activity (e.g. NDLR worked with Jorum developers, exchanging information on the repository system they both used). Other national funders also played a part. The Irish HEA (Ireland's equivalent of HEFCE) and the Scottish Executive also funded cases described in this thesis. It is notable that the only case without links to external funding was based at the OU. This HEI is significantly larger than other UK universities and colleges, and as a distance teaching institution it engages with educational resource development and delivery in a markedly different way (discussed further in Section 7.3.1). As Chapter 4 shows, the six cases represented the spectrum of reuse activity over the research period. JISC and other funded projects were at the forefront of reuse facilitation activity.

It is not possible to assess whether the level of activity in this area would have been the same, in form or scale, if this external support had not been available. There is little evidence from the cases studies that institutions would have pushed for the sharing of learning objects and other digital resources to the same timescales, or followed the same approaches, without initial external investment to encourage this. To encourage new activity and fresh approaches

was, of course, one of the reasons for project funding being made available.

JISC is a particularly technologically-enabled organization with funded projects frequently led by educational technologists, and with a technology rather than academic focus. Although the outcomes of JISC-funded products are likely to be used by, or affect the practice of, teaching and learner support staff, the focus of JISC reuse projects, reflecting the interests of this organisation, can march ahead of institutional teaching practices. This can create a distance between projects and the practitioners that they hope to inform and influence. Phillip Haynes, an academic at the University of Brighton, commented on this within a JISC online conference (Haynes, 2006):

Sharing resources and processes, case studies, etc. in an easy accessible and useable manner has surely got to be centre stage. I know there are many projects trying to do this, but I think many are two-three steps ahead of the mass of teachers rather than working with them where they are and with the daily dilemmas and challenges they face. There is a lot of good stuff going on, but it needs to be mainstream and supportive for generic teachers. Implementation is almost everything ... (Haynes, 27 March 2006, 8.13pm)

There are four principal ways in which funding bodies appeared to influence the resource reuse activity which they funded:

- *the short and fixed term nature of the funding* limited the type and scope of activity attempted;
- *constraints and conditions placed on projects*: e.g. the type of reusable resource, the source of the resource, and the way in which these are made available;
- *the impact of 'serial' project teams*: e.g. with staff from one reuse project moving into, and influencing, other projects in the same field;

- *sustainability and embedding concerns*: e.g. focus on targets established in the invitation to tender, or otherwise the funder, as evidence of success.

For example the 20 JISC-funded RePRODUCE projects required to reuse resources created elsewhere within a course with students (Earney, 2009) were advised that linking to externally held resources did not constitute reuse (Williamson, 2009). While the projects may have preferred a more convenient solution (linking), the project funders directed them to explore a more challenging route (local hosting).

Projects can therefore lead to exploration of particular options for activity and discourage exploration of others. As every project cannot be funded, it is necessary that those that are focus on what is the most relevant activity to the funders, who are likely to take a wider view of sector needs than the project staff or funded institution. Funders such as JISC, conscious that they cannot fund and support all relevant activity, also pursue other methods of achieving change (e.g. education, communication and community building). To demonstrate that their wider objectives have been met, project funders may also require that certain baseline activities occur as a condition of funding. Some may include activity which the project staff would not otherwise have elected to pursue, e.g. deposit into a specific repository, as a 'keep safe' measure. Funding agencies are themselves subject to performance measurement. This can lead them to emphasise metrics such as hours deposited, downloads, hits, etc. to demonstrate their own effectiveness and ensure further investment in this activity area. These measures may in some cases not be the best evidence of reuse of resources.

In the UK projects receiving no direct external funding are not isolated from projects that do. The project reports and other dissemination that funders require (e.g. presentations at

workshops and conferences) provide a body of research based on reuse practice from which others, not funded as projects, also draw. In this way reuse projects have had a wide influence.

2.6 Social factors and the climate for reuse

Although technical systems often facilitate the exchange between creator(s) and user(s), social factors are at the heart of reuse. Perhaps in recognition of this, reuse of resources has been increasingly referred to as ‘sharing’ resources, relating this to natural social behaviour (e.g. Harrison and Smith, 2003).

The title the Harrison and Smith paper *All I Really Need to Know About E-Content I Learned In Kindergarten: Share and Share Alike* suggests that sharing is easy to learn to do. However participants in educational reuse (providers and users of reusable resources) can be teachers, students, librarians or repository staff, project teams, publishers (both formal and informal), institutional managers, educational developers and technologists. Their motivation and activity centred on reuse will vary depending on their institutional and discipline context, as well as their economic and technical constraints. Because sharing of online resources often occurs online, the participants who supply and who use the resources are likely to have no previous connection.

This thesis concentrates on the user groups who have active roles within reuse of resources in UK HEIs, rather than across education more broadly, or more informally. Its focus is on educational resource sharing related to formal educational contexts (i.e. with registered students within HEIs). However, the case analysis illustrates the diversity of social networks that reuse spans, and the range of behaviour and beliefs that it draws from. A distinction can be drawn between those educational practitioners who are primarily concerned with the

‘promise’ of reuse and those who are concerned mainly with reuse as an educational ‘practice’ (Pegler, 2011). There are differences in terms of the time horizons and the issues that the two groups focus on. Many of those involved in early reuse practice have been involved in, and perhaps motivated by, their research interests. For example in CS1-H806 the academics were attracted by the promise of RLOs. This is perhaps a general feature of innovative practice in UK HE, where academics are usually researchers as well as teachers.

2.6.1 Generic or discipline-based sharing: Disciplinarity and reuse

For many academics, their own scholarly activity, and that of their students, will be within a single subject area. Teachers within that discipline area are part of a community with shared educational experiences.

Disciplines, by definition, suggest a particular conception of knowledge and broad agreement about content, epistemology, specialist vocabulary and research approaches. The UK Higher Education Academy (HEA) Supporting New Academic Staff (SNAS) initiative has talked about teachers’ ‘primary allegiance’ being their subject, rather than their institution. SNAS endorsed the view that while generic literature supporting new academics has some value, ‘it does not do justice to the complex issues of course design that are central to the concerns of disciplinary communities’ (Jenkins and Burkill, 2004). This suggests that discussion and sharing of teaching approaches and resources is more likely to occur between staff teaching the same subject.

This is not to suggest that examples do not exist of the usefulness of reusing content from one disciplinary context within another. Gardner and Turner (2002), report a small-scale experiment in ‘free contextualising’, stepping outside a discipline to experience teaching in another discipline. However, this is uncommon, and although a useful developmental activity,

teaching expertise is more usually acquired and supported within a discipline. Healey (2000) and others have stressed the centrality of discipline identity in teaching and many of the smaller repositories and collections of reusable resources focus on a single discipline. Three of the four repository cases researched here relate to discipline specific repositories (Case Study 2: Stòr Cùram (CS2-Stòr), Case Study 3: L₂0/LORO (CS3-L₂0/CS3-LORO) and Case Study 4: SORRS (CS4-SORRS). Support of the national repository case (Case Study 6: NDLR (CS6-NDLR)) is arranged around *disciplinary* communities of practice.

Research in the US into ‘non-use’ of the Cornell institutional repository supports this view. Cornell faculty gave many reasons for not using repositories: redundancy because of other modes of disseminating information,; the learning curve of engaging with new technology and systems; confusion over copyright; fear of plagiarism and having one's work scooped; associating one's work with inconsistent quality (through juxtaposition with other work without benefit of peer review). There were also concerns expressed about whether posting a manuscript constituted ‘publishing’ as this was a new approach to dissemination and unfamiliar to Cornell faculty. Davis and Connolly (2007) concluded that discipline-centricity may be one of the most significant barriers to using *institutional* repositories for sharing (deposit) of educators’ own resources:

Cornell faculty have little knowledge of and little motivation to use DSpace. [The repository system used at Cornell]. Many faculty use alternatives to institutional repositories, such as their personal Web pages and disciplinary repositories, which are perceived to have higher community salience than one's affiliate institution. (Davis and Connolly, 2007, p1)

2.6.2 Individualism and academic culture

Malcolm (2005) noted the duplication of effort across and between institutions, observing that collaboration at subject level within and between institutions is not a simple matter. Malcolm (2005) points out some of the consequences:

This duplication of effort across and between institutions is, of course, not new. But it is newly visible. And it is newly unfortunate. The economics of content development have changed in two significant ways. Firstly, the cost of producing information now outstrips that of its online distribution to such an extent that its repeated development is more profligate of resource than ever before (Shapiro & Varian, 1999). Secondly, the cost of producing first versions within HE have themselves increased. ... It is not, therefore, surprising, that ways of reducing both the duplication and its attendant costs, are attractive to HE managers. (p34).

University teachers have a high degree in autonomy in determining how they teach. Downes reinforced this view with his observation that: 'Traditional courses are typically created by a single artisan.' (Downes, 2004b, p22)

Malcolm was noting an apparent tension in academic culture between managers who see no value in 'reinventing the wheel' in search of incremental and potential improvements, and academics whose research practice encourages them to revisit established practice and attempt to improve on and inform this in new ways.

Anderson *et al.*, (2004) charted six barriers to change in academic culture in terms of relative difficulty to influence these over time. While most barriers they identify (*organisational ability, technical skill, conceptual thinking, and will*) appear to become less entrenched over time, problems of *reinvention* and *content* tended to increase in difficulty. These authors link this to

problems in accessing sufficient content to support distance education and e-learning and the problem of repetition of content over many systems (reinvention). This issue of reinvention is one which CS4-SORRS attempted to address.

The promotion criteria applied in UK HE traditionally rewards research achievement rather than teaching excellence. This system may have impact on commitment of time to improving or modifying teaching practice. Some educators in HE may restrict the amount of time and effort that they are willing to give to changing and updating their teaching practice which they feel is already adequate to their needs. Not only is research more valued as a measure of academic success, it has also traditionally been more visible than teaching outputs. Those will usually only exceptionally be visible to anyone other than the students who study the course.

Since research excellence is conventionally judged by peers (academics within the same discipline rather than the same institution) there is a limit to the extent to which managers can influence the behaviour and priorities of academic staff. Anderson, *et al.* (2004) commenting on the nature of management within HEIs drew on the work of Mintzberg and Quinn (1988). This pointed out that in a professional bureaucracy such as a university, innovation can be resisted, even when environmental pressures make radical change imperative. Managers may perceive little difference between alternative teaching resources, viewing these as repeating each other with only 'subtle variation' and seeing them as interchangeable. However valuing difference and preserving the autonomy to create bespoke resources that reflects personal research interests may be considered by some academics as an essential freedom, central to originality, creativity and academic credibility.

Collis and Strijker (2004), researching technical and *human* issues in reusing learning objects, identified the local context and culture of the academic users as one of the most substantial

incompatibilities that initiatives promoting reuse of educational software faced, based on examples dating back to the 1980s. In research which compares the culture for reuse of RLOs in military, corporate and higher education learning and teaching environments they noted substantial differences in the level of freedom enjoyed by the educator which influenced perception of their role:

The designers and instructors of university courses are generally part of the academic staff and their freedom within course development is large. The instructor's professional identity is predominantly based on his research. ... Within this research orientation, instructors also designed, develop and deliver courses, frequently bringing in their research into the course materials. The instructor can choose how to structure the course in terms of organisation, course material, and assessment and will strive to integrate aspects of his current research projects into courses. This means research-specific and sometimes instructor-specific knowledge is used in many courses. Because of the research aspects, many courses are revised every year and upgraded with new articles and relevant material. (Collis and Strijker, 2004, p3)

These researchers contrast the freedom of university teachers with that of the corporate trainers and military trainers studied over the same time period. Trainers working within a corporate environment are required to deliver courses to achieve specified objectives, usually associated with the business needs of the organization:

Courses are client-orientated and course developers must respond quickly to new requirements and requests. In contrast, courses delivered to the military are highly structured, and slow to change or adapt (op cit, p5).

But for both corporate and military learning delivery, the specification of what was taught and how was less devolved, and far less under the control of the individual educator than was the

case in HE. Collis and Strijker also pointed out that the philosophy of learning is very different across the three environments, an important consideration given the influence of military training approaches on the work on RLO standards such as SCORM.

2.6.3 Academic concerns about technology and teaching

Reuse of online digital resources requires engagement with online learning and teaching practice and its technologies, which in itself presents a challenge. Some educators have a strongly sceptical view of the potential of learning and teaching online. This was particularly well illustrated though the writing of US historian, David Noble. Noble offered widely quoted criticism, talking about the threat of distance education models and the rise in 'digital diploma mills' which undervalued and removed control from the individual academic. He criticised automated reuse of resources created by these academics but beyond their control:

'Automation - the distribution of digitised course material online, without the participation of professors who develop such material.' (Noble, 1998, p5)

Noble's views are inconsistent with either wishing to create online versions of traditional teaching resources, or wishing to reuse online resources within university teaching. He saw changes in practice as a broad threat to university teaching as a profession and his criticism of the role of online education was widely disseminated. Some of his concerns about online resources and their reuse had some foundation. The educational technologists and innovators who were pushing development of RLOs as a new and viable approach were suggesting more radical changes in teaching practice than simple substitution of one set of resources for another.

Sloep (2004) envisaged a significant alteration in the roles of teachers, should RLOs be adopted on a wide scale:

In face-to-face teaching, all teachers are more or less alike in the responsibilities they bear and the tasks they have to carry out. They prepare for class, lecture, mark papers and assess their students' performance. In an educational system based on learning objects, this situation will change considerably. There will be extensive role differentiation. In a learning object's delivery phase, although the role of traditional teacher will still be recognisable for the most part, the details of the tasks will differ. ... Preparing for lecturing now becomes an authoring process, involving various professionals, not just content experts [academics and lecturers] but also educational technologists, graphic designers, multimedia experts and perhaps programmers. (Sloep, 2004. p144)

Sloep (p144) acknowledged that there was resistance to the idea of such changes in the traditional teaching role, and mentioned Noble as an example of such opposition. It is significant that Sloep, with Koper and Salmon whose work he also quoted, all have a background in distance teaching and online learning where these changes were already accepted.

McGrath, in contrast to Noble's view and also to that of Sloep, suggested with relation to OER that the opening up of these resources would lead to a 'new learning ecology' (McGrath, 2008, p20). This would use technology to free educators from the resource scarcity around which higher education institutions were traditionally organised. Stuart D. Lee, a UK academic and educational technologist, noted the potential for change through OER, and also the problems to be overcome. He pointed out how 'closed' University teaching has been in the past, drawing on the experience of the fictional character Jude the Obscure (Hardy, 1895) for the title of an

article on OER: 'The gates are shut: Technical and Cultural Barriers to Open Education' (Lee, 2008). These researchers while presenting different views highlight the high expectations of significant social and institutional change arising from sharing resources more openly than previously. They point to the 'promise' of reuse while holding different opinions about the effects.

2.7 The impact of technology and the climate for reuse

Technology has already been mentioned as an influence within this period, for example in changing the opportunities to support students with disability. The pace of change in technology use within teaching in HE has been unprecedented. Over the past decade there has been a transformation in access to and availability of online content on and off campus. This has fuelled a significant shift in behaviour for many learners and educators. For example, as recently as 2002, at the start of the UKeU activity, it was considered reasonable to design *online courses* so that they would run adequately over a connection speed of 56kbps. This slow connection speed dictated the options for using audio and video embedded in the course, restricting the size and frequency of multimedia elements.

Berners-Lee has described the web as providing '... a space in which anyone could be creative, to which anyone could contribute' (Berners Lee, 2005). However this has only been possible for the majority of users since the shift to Web 2.0 (O'Reilly, 2005). As the JISC Infokit Guide to Social software (2009) points out: 'although the web became a repository of information, it became a place where only technically-adept users and organizations would author content'. Authoring and disseminating content using Web 2.0 technology is offers variety in media and less technically complexity. This creates an environment for creating online resources with what could be described as low 'barriers to entry' (Porter, 1979). Porter suggested that where the costs of becoming a supplier within a market were low, and there are few barriers to entry

such as specific skills or restricted access to tools, then more competitive activity within that market could be expected. Web 1.0 and online learning lowered the barriers to entering education since it was no longer necessary to acquire a physical space to teach, and the traditional high volume print runs of distance learning were no longer necessary to reach distributed learners. The advent of Web 2.0, and in particular user-generated content, further lowered the barriers to entry, by reducing some of the specialist skill and tool barriers to producing and publishing content online.

As Beagrie (2005) pointed out, internet users are capturing and storing increasing amounts of digital information about and for 'themselves'. This can range from e-mails to documents, articles to portfolios of work, digital images to audio and video recordings. He identified two major trends which underpin this development. The first was the increase in computer processing power, and the availability of cheap and more effective storage, the second was 'increasing consumer digital creativity and an appetite for digital content' (Beagrie, 2005). Not only has the supply of digital resources grown, engagement with online content as everyday activity has also grown rapidly, increasing demand to keep pace with supply.

Access to digital resources coupled with improved internet access has raised expectations of the variety of resources available, and how they will be made available. It has also changed how learners and teachers store resources, and their motives for going so. In 2002 storage space online was only available on a paid-for basis. There are now many free options (e.g. Google docs), and services (e.g. Twitter) to enhance the speed and spread of information about new resources. Thus the level of supply and the level of awareness of resources have both increased, supported by online tools that have emerged in the past decade.

2.7.1 Adoption of open source and open licensing

In the Foreword to 'Giving Knowledge for Free: the emergence of open educational resources' (CERI, 2007) Barbara Ischinger points to the tension between the potential of new technology to support, develop and distribute learning and the way that learning content is often 'locked up behind passwords within proprietary systems, unreachable for outsiders' (Ischinger, 2007, p3). The interest in open source software (sharing the code and development of programs across an open online community to create and sustain strong and sustainable applications) was already established by the time that report was written. There are parallels between open source and open content or OER (Wilson, 2010), not only in wishing to open up resources to allow others to benefit the wider community (altruism), but also in anticipating a stronger, more sustainable resource as a direct result of sharing openly. Sharing content using open licenses, particularly in forms which permit adaptation, review (comment) and onward dissemination, is central to the change of emphasis inherent in Web 2.0 (O'Reilly, 2005). The rise in acceptance and interest of open content and OER arguably follows the same trend, although there is more likely to be a restriction on commercial exploitation, which open source explicitly permits.

2.7.2 Changing expectations of technology

There has been an escalation in use of online resources and systems throughout the period, and not only in education. Students and educators in HE, have become increasingly likely to use the internet in their daily lives and more skilled at using it than their equivalents were in 2003. Some online trends which have had impact on reuse of educational resources were anticipated, for example speed of access to online resources improved as expected. However, the way online resources were used also shifted, not only in where and how these are accessed (e.g. via mobile devices wirelessly) but also in appearance (e.g. more multimedia websites to take advantage of broadband and mobile broadband). How participants in HE

engage with websites and the resources in them, and discover content (e.g. via RSS feeds) has also shifted. Technology use which was relatively unusual or even impossible in 2003, was by 2010 experienced as the norm by many participants in HE, both educators and students.

At the start of the research period, Prensky (2001) attracted attention when he coined the term 'digital natives' to describe young people who had grown up as users of the internet. He suggested that they approached learning with ICT skills and expectations different from those of their teachers. In Prensky's view teachers were 'digital immigrants' with a non-native, awkward, and limited, understanding of the potential and use of ICT. His classifications have subsequently been challenged and tested through research. White (2009) has suggested a different typology, differentiating between 'residents' (those who inhabit an online environment on a regular or sustained basis) and 'visitors' (those who are more occasionally participants). Jones and Cross (2009) noted that digital natives are only one, as yet not large, proportion of the student population. They suggested that participants in HE are diverse in terms of familiarity with new technologies and adoption of these.

However categorised, by 2010, most students in HE were familiar with online technologies in a way which would have been atypical for all but a minority at the start of the research period. At that stage, looking to the future, Walker (2003) commented that: 'Learners and teachers expect, as consumers, that access to learning resources will be as personal, immediate, and unimpeded as access to a book or CD on Amazon'. Technology has achieved this in many contexts. From the six case studies there is evidence that the 'ease of use' expectation which Walker notes carries over from e-commerce into educational activity. For many consumers of reusable resources online, there is an aspiration that searches should operate 'like Google' rather than as conventional online educational systems operate.

2.8 Overview of PEST analysis

From this chapter it is possible to see how the various Political, Economic, Social and Technical factors shaped the environment in which reuse and repurposing of online digital resources activity occurred. Policy makers and funders have supported online reuse activity, with economic and political climates increasingly emphasising effective online use (and reuse) of educational resources in HE. Wider challenges such as ‘massification’ and increasingly diverse students, provided encouragement for greater resource reuse. Reuse offers both efficiencies in ‘scaling-up’ online provision, and greater variety of resources to support a more varied student population. Technological developments have made intensive online reuse more viable, and created new opportunities for sourcing, publishing and publicising content.

However, the academic culture continues to be one where widespread reuse of resources could be seen as a threat to originality and creativity, or an activity of relevance to managers and technologists, based on performance rather than pedagogical benefits. The pace of change relating to academic practice is slow and experiences observed in projects do not necessarily reflect broader activity. Viewed in isolation individual projects may not be a good indicator of how reuse practices may develop.

Many academics do recognize the benefits of improved access to *research* resources even if more cautious about the virtues of sharing online educational resources. Cornford and Pollock (2002, p171), writing about the campus as ‘a resourceful constraint’, refer to Abeles’ observation that:

knowledge, which was once captured in the cloistered halls and libraries of academia, in a wired world, is immediately made available. Similarly students who once travelled great distances to listen to lectures of scholars can now access this knowledge via the world of the Internet. (Abeles, 1998, p606)

This chapter has outlined the main macroenvironmental factors impacting on reuse of digital resources activity within UK HE. This was a significant period in terms of technological turbulence, and the openness of policymakers to fund projects focused on changes in reuse practices. It was also a time where powerful drivers to encourage sharing online resources emerged and different tools became available to do this socially (Engeström, 2005). Arguably by the end of the period the incentives to change practice and adopt reuse within a rapidly shifting environment were even more obvious. The Observatory on Borderless Higher Education in 2004 published an aptly-titled report which sums up the mood of the research period *The perfect e-storm: emerging technology, enormous learner demand, enhanced pedagogy, and HE raised projects* (Bonk, 2004).

Chapter 3: The reuse mesoenvironment

3.1 Mesoenvironmental analysis in this research context

Within any longitudinal research there will be emergence and waning of trends, as well as concerns about what are *trends* and what are shorter-term fashions or fads. Chapter 2 identified political, economic, social and technical factors which impacted on UK HE during the research period and shaped the wider environment in which online digital reuse activity occurred. Chapters 5 and 6 present microenvironments in which reuse facilitation occurred, the six case studies.

While the terms macroenvironment and microenvironment are standard terms in economic analysis, the term mesoenvironment is less familiar and requires further explanation. As the prefix 'meso' implies, it refers to a level of environmental activity in between the two other levels. In this thesis the macro-level analysis identifies the drivers and inhibitors within the UK HE environment which encouraged and supported shifts towards reuse of digital online resources over the period. For example, educational policies directed at promoting resource reuse as part of a wider agenda for change. In contrast, the case studies offer examples of reuse, or reuse facilitation, occurring at inter- or intra-institutional level, informed by a specific context or conditions.

Jones and Dirckinck-Holmfeld (2009), writing on analysis of networked learning practices, note that a meso- level of analysis offers a useful supplementary level of analysis when researching complex social systems. They suggest that this ensures that interaction which is intermediate between 'small scale local interaction and large-scale policy ...' (p11) is addressed, helping to

identify relevant detail within complex and potentially monolithic social systems. They also describe an analytic role for meso-level analysis:

In this analytic form meso is an element of a relational perspective in which the levels are not abstract universal properties but descriptive of the relationships between elements of a social setting. In this view meso is not a characteristic that adheres to a particular set of arrangements it arises in the processes of relating these arrangements upward towards macro processes and downward into micro processes. (Jones and Dirckinck-Holmfeld, 2009, pp11-12).

This suggests that the activity at the boundary between meso/micro and between meso/macro, is an important point at which to direct analysis. Vavoula and Sharples (2008), also use the term 'meso level' to describe one of three levels of analysis applied to evaluation of mobile learning. They use the term to describe analysis of the learner experience, in contrast to usability (micro) and integration (macro). These levels are related to each other, although offering distinctive characteristics and scope for analysis.

Within this thesis the mesoenvironment level analysis represents a distinct area, one of three levels of analysis. It relates to activity informing reuse which occurred contemporaneously with the cases reviewed. This included the work towards developing standards, shifts in licensing and changes in approaches to learning research construction (i.e. as RLOs). Within the cases the boundary between meso/micro activity was significant, particularly in analysis of CS1-H806 (Chapter 5) which offered a clear example of awareness of the mesoenvironment informing microenvironmental practice in UK HE.

3.2 Introduction to the reuse mesoenvironment

The focus of this chapter is on the reuse ‘mesoenvironment’ over the period 2003-2010. This coincided with the emergence of new approaches to facilitating use of digital online learning resources and increasing engagement across UK HE in both online delivery of teaching and learning, and blended elearning; using digital online resources within face-to-face and mixed mode teaching practice (Littlejohn and Pegler, 2007). The type of resources available to teach in higher education was changing at the same time as developments occurred in how the resources could be used.

At the start of the period, the emphasis was on reusable learning objects (RLOs). At the end of the period the emphasis was on open educational resources (OER), also known as open content. Each approach sought to facilitate reuse in particular ways, and this chapter introduces both resource types and some of the thinking that has driven their adoption, and evolution. The mesoenvironment of reuse informs interpretation of the cases in Chapters 5-6 and analysis in Chapters 7 and 8. However, while the cases and timeline relate to UK (and in one case Irish) HE reuse activity, the drivers within the mesoenvironment to which these cases responded, occurred at both international and national level.

3.3 What are reusable learning objects?

The period commenced with strong advocacy of learning objects as a universally-applicable approach to reuse. However answers to the question ‘What does the term ‘learning object’ mean?’, have been unhelpfully obscured by the many different definitions attached to this term over the past two decades (Hodgins, 2002). Research into reuse over a period when learning objects are referred to, must first therefore clarify what precisely is meant by the term. This thesis uses the term to describe content which is digital and reusable in form, has

been developed for use within teaching or learning, or can be used for this without further adaptation. These criteria are met in the definition: 'a learning object is a digital piece of learning material that addresses a clearly identifiable topic or learning outcome and has the potential to be reused in different contexts' (Weller et al., 2003a), but could also be met in other, alternative definitions. This chapter commences with an explanation of why agreement of a single definition has been difficult. This serves to illustrate the complexity of the research area and the fundamental differences between researchers about how reuse of resources should be achieved.

McGreal (2004, p8) collated and classified RLO definitions and suggested five groupings: Anything and everything; Anything digital, whether used for learning purposes or not; Anything with an educational purpose; Digital objects that have a formal educational purpose; and Digital objects that are 'marked' in a specific way for educational purposes. These classifications reflect the level of uncertainty that existed amongst researchers. Downes (2004c) made the point that a learning object could be anything, suggesting it could even be a used tissue paper, an example conforming with the very broad definition offered by IEEE (2002): 'any entity, digital or non-digital, which can be used, reused or referenced during technology supported learning' (p5).

Tom Boyle, who subsequently led the UK RLO-CETL activity, criticised this imprecision, while recognising why this arose: 'In order to provide a non-contentious basis for standardisation, a learning object is defined to be almost anything. The standards are declared to be pedagogically neutral' (Boyle, 2003). He further points out that this broad definition does not take us closer to understanding how to create and use learning objects as:

there is a marked limit to the productive reuse and repurposing of learning objects that have not been designed for these purposes in the first place. There is, in the end, a limit

to what can be achieved by intervention after the event (after the design and authoring process). We cannot, of course, change the past. In the future, however, learning objects must be developed with potential reuse, and especially repurposing in mind (Boyle, 2003).

Boyle was suggesting that learning objects should be designed to meet a specific, stricter, definition and one centred on reuse. Longmire in his 'primer' on learning objects suggested: 'LOs must be free-standing, non-sequential, coherent and unitary' (Longmire, 2000). Learning resources defined as learning objects within Longmire's classification will, as Boyle suggested, have usually been *created* or repurposed as learning objects. The specific requirements that Longmire suggested became relevant only with the shift to delivery of digital learning and teaching resources through virtual learning environments and other online systems. These more restrictively defined learning objects, fall into McGreal's fifth grouping 'digital objects that are marked in a specific way for educational purposes' (McGreal, 2004, p9). Definitions of this type assume that the creator or supplier has adopted specific practices in *obtaining*, *labelling* and *offering* the resource.

Some researchers have suggested that a learning object *becomes* a learning object when someone decides to use it as one (e.g. Sosteric and Hesemeir, 2004). This idea is attractive as it excludes anything not used for learning, and any resource which has not attracted use in practice. However it creates practical problems in assuming that the researcher can know when and whether the resource is used 'in learning'. Although this may be possible within controlled research or project conditions, there is currently no comprehensive way of identifying when, where or how use or reuse occurs in practice. This is even more problematic if the resource is widely available in relatively unrestricted form, as it may be widely copied and disseminated. This copying (i.e. downloading) process does not necessarily represent use.

For example, while 84% of FE colleges reported that they downloaded NLN resources, only a minority (9%) reported that they made use of these as ‘common practice’ (Davies, 2004, p18).

This thesis is concerned with online digital reuse, so non-digital resources are not included in its coverage. While many non-digital resources used in learning and teaching may be reused, whether a printed textbook, or a tissue, there are limits to their reuse potential, and problems with using these online without a change of format. In practice this is a relatively minor condition, as many non-digital resources, e.g. printed texts, photographs, or overhead transparencies, can be easily transferred into digital format. These newly-digital resources can then be shared online, adapted for new uses/users and made more discoverable. Retalis (2003) pointed out that there is greater potential for reuse of digital resources, because these are easier to locate through connected repositories: ‘Learning objects [using this term loosely] pre-existed on the Internet in the form of illustrations, book chapters, articles, etc., but it was more difficult to trace them’ (Retalis, 2003).

In this thesis definitions which exclude nothing have been set aside as not only unhelpful to understanding what affordances learning objects may have, but obstructive to interpreting practice. Rather than McGreal’s five types of learning object definition, *reusable* learning objects are here identified as belonging to either of two broad categories:

Figure 3.1: Two types of reusable learning resource definition

CATEGORY 1	Formatted/Created as reusable learning objects based on adherence to one or more reuse-friendly requirements, e.g. RLO standards.
CATEGORY 2	Functions as a reusable learning resource, i.e. digital and for learning, but not consistent with the Category 1 definitions.

This classification recognises that what is described as a learning object may not have been designed as a learning object but can function as one. Some distinction between the two categories of definition needs to be made. This is not simply a matter of semantics, as Chitwood, *et al.*, noted when reporting development of the Wisconsin Online Resource Centre. They observed that teachers did not know what was required of a learning object and the quality of the supply was therefore very variable:

In the majority of cases, developers who initially believed they had a clear idea of what a learning object is actually submitted ideas and information that was far enough off the mark that they needed major revision before they went to programmers (Chitwood, *et al.*, 2000, p18).

Confusion arises for suppliers and users of learning resources when what is required are RLOs which conforming to Category 1 type resource definitions, but what is delivered are closer to Category 2 type resources. While the *human user* of the resource may be indifferent to these differences, and repositories may offer 'learning objects' of both types, those supplying resources need to know what is required. The technical operation of the service offering the resource may depend on some key part of the learning object specification (e.g. type and form of metadata, or the way that components are ordered (content packaging)), i.e. a Category 1 definition.

The role assumed for automation in reuse is a key differentiator between the definitions types. Wiley (2003) pointed to divergence in agreeing on a form and purpose for learning objects centred on expectations of automated reuse. He noted that some researchers 'employ technology in the form of reusable educational resources ("learning objects") and automated instructional ("intelligent tutoring") systems', having surmised that inclusion of human

instructional designers would restrict the potential to scale online education in any cost-efficient manner. Other researchers were:

... championing socio-cultural approaches to learning, specifically interested in the role of community in learning, claiming that human-to-human interactions are not niceties that make learning more interesting or fun, but that every kind of learning [from] simple rote memorization requires complex social negotiations and structures to support the development of meaningful understanding. Technologies employed by these researchers include wikis, blogs, and other democratic collaborative media. (Wiley, 2003c, p1)

This second group may see reuse as a secondary, or incidental, advantage to using learning objects. Reuse is a primary objective for the first group, whose expectation is of technologically mediated reuse of resources which are technically more than simply digital and online.

3.3.1 Learning objects and Lego

The metaphor of learning objects as Lego is well-established, and consistent with the restrictions usually placed on learning objects in Category 1 definitions. The Lego brick is free-standing, non-sequential, coherent and unitary (as Longmire (2000), suggested learning objects should be). It is also usually small in size, and can be combined with other bricks to form a structure which can then be disassembled so that the individual brick (resource) can be reused in another context. Each type of brick can be easily described and understood using standard terms. It is interchangeable with other bricks (resources) of the same size. This efficiency in reuse arises because blocks of the same type conform to the same design standards. Associating the behaviour of learning objects with Lego continues to be informative about the expectations surrounding learning objects at the start of the research period,

although this metaphor was already being challenged by then and became less commonly used.

The nature of the challenge to this metaphor is itself significant. Wiley suggested a different analogy, expressing concerns that slotting together learning objects to create a course was over-simplified as a simple and skill-less process:

- 'Any LEGO block is combinable with any other LEGO block
- LEGO blocks can be assembled in any manner you choose
- LEGO blocks are so fun and simple that even children can put them together' (Wiley, 1999, p1)

Wiley maintained that all of these qualities were true of Lego, but not of learning objects, and suggested atoms as a more suitable analogy. These also represented small things which could be combined to form larger ones, but did not encompass the three assumptions he associates with the Lego metaphor. He argued that learning objects would and should be contextualised to a certain degree, which would suggest some learning objects they could be combined with and discourage (or render nonsense) their combination with others. Reuse, following his atom analogy, would be more challenging for some atoms and some combinations. Some content (context) cannot be broken down (removed or reduced) without considerable effort. He also suggested through his atom analogy that knowledge and skill are necessary in handling, combining and reconfiguring learning objects, in contrast to the relatively 'skill-less' process that assembly of Lego suggested.

Pegler (2003) has argued that Lego continues to offer a useful metaphor to understand the operation of learning objects. These can be designed for more specific contexts as well as for generic ones. There is a catalogue of components with specific attributes and unique codes

that enthusiasts can select from to create new models. The range includes non-standard 'bricks' (e.g. a mask for a Darth Vader model) specifically created for use in only one context (model). These are, in learning objects terms heavily internally contextualised, although they may be reused in a limited range of other contexts. Specialised Lego 'bricks' do not meet either of the first two conditions that Wiley associated with this metaphor, yet they are designed for use with and as Lego. As with some learning objects, they have a reuse potential which appears close to zero, although both may be used out of context in interesting and creative ways by a skilled or imaginative user.

Wiley's third objection relates to the skills required to use learning objects (and Lego). While an unskilled child could combine Lego bricks with minimal instruction or skill, the result may be ineffective and unattractive in the same way that a course assembled from learning objects without skill would be. His atom metaphor suggests that there is a single correct way to assemble the learning objects, or at least a very limited number of ways. However this is not necessarily true of Lego *or* learning objects. Something could be built from these with a little skill or knowledge which might be useable. However someone with considerable skill and knowledge who has access to the full catalogue of resources, could create something which was significantly better than a novice could. Less experienced users could copy the design to replicate the model once they have the original to refer to. Significantly, the product made of Lego or learning objects, represents a temporary structure that can be remade, e.g. by the instructor in future presentations of a course, or by students working with a course consisting of learning objects which has been designed to be customisable and reconfigurable by users.

The Lego analogy unhelpfully emphasised some assumptions about the internal *structure* of learning objects, reflected in the emergence of recommendations about contextuality and granularity that emphasise uniformity, (see Section 3.7 and 3.9). However it contributes a

powerful metaphor for the way that learning objects can be *used*, and the nature of the learning designs that they can facilitate. In CS1-H806 there is fuller discussion of the temporary structuring and restructuring of a course made of learning objects, an approach which resembles the use of Lego although the components in this example were not standardised in the way that Wiley suggested Lego was.

3.3.2 Is digital and online enough?

If learning objects are resources which conform with the less strict Category 2 descriptions, i.e. with online and digital being the only requirements, what is the function of the additional requirements articulated in the Category 1 definitions? The answer to this has shifted during the research period, with some convergence between the two categories occurring. Some of the criteria associated with Category 1 descriptions and seen as central to reuse at one time (e.g. extensive standardised quality-assured metadata, small size, de-contextualised content), are now regarded as less necessary to secure reuse. This was in part a response to changes in technology, specifically use of and access to the internet in HE, and the online tools which were increasingly available and useable for teaching staff. This led to the emergence of user-generated resources and reuse practices (Leslie, 2010) which may not conform with Category 1 definition restrictions and may present challenges to the application of such restrictions. The balance of *supply* of reusable learning resources was, by the end of the period, tipped towards Category 2 type resources rather than learning objects of Category 1 type, because of shifts in technology use by creators of online resources, and the skill-set and preferences around these.

Within teaching practice, the use and *demand* for reusable learning resources is not restricted to Category 1 forms. In UK HE acceptance of repurposing as a valid, perhaps dominant, reuse approach (see Section 3.6) favours Category 2 type resources, as does recognition of resource reuse contexts which include blended learning. Within blended learning interoperability and

other conditions imposed by Category 1 definitions are not such relevant considerations (see CS2-Stòr).

Conforming to stricter definitions requires additional effort and may require specialist resource. By the end of the research period some of the advantages of specific rules around *obtaining* (creating or reformatting), *labelling*, and *offering* reusable learning resources had been eroded. Between 2003 and 2010 there was increased supply of digital online resources from a range of sources (including OER) and increasing adoption of Web 2.0 tools and networks which educators started to use to support identification, description, sharing and reuse of resources online. Some of the special attributes associated with reusability and with RLOs at the start of the research period declined in importance, and in many contexts appeared unnecessary.

Chapter 5 and 6 provide examples of where Category 1 conditions have been applied (e.g. CS1-H806) and at least some of these conditions did not obviously contribute to the reuse that occurred. However, assumptions about how to facilitate reuse influenced how reusability was facilitated throughout the period. Some of these assumptions continue to have an effect on how repositories and other reuse projects and services operate in 2012. The diversity in these assumptions is what led to differences in opinions about what a *reusable* learning object would be and how it would be used.

In 2010, Wiley asked whether being simply free and available online made a resource 'open' and whether further conditions, i.e. possession of an open license, were necessary in practice (Wiley, 2010). Was being digital, online, open to view (i.e. not residing behind an institutional or departmental firewall), and free to use sufficient to ensure reusability? That this question was asked, and proved so difficult to answer, was further indication that acceptance of the

desirability of applying technical conditions to achieve reuse of learning resources had shifted since Wiley suggested that the Lego analogy was an insufficiently complex metaphor (Wiley, 1999).

3.4 Course reuse and versioning

As Chapter 1 noted, reuse of resources created elsewhere and reuse of resources previously used in another context is a feature of UK HE. Chapter 2 outlined why reuse was becoming a more desirable approach, notably in response to larger student intake and a more diverse student population (Section 2.4.1).

This thesis uses the terms reuse and repurposing, but other terms have been used in UK HE to describe this activity: single-sourcing, multi-sourcing, versioning, re-versioning, (even pre-versioning), repurposing, reuse, recycling. Alternative terms are adapting, modifying, localisation, customisation, updating, sharing or even ‘mutating’.

An institutional project at the Open University, CoUrse Reuse and VErsioning (CURVE, 2004) provides a typology to describe versioning (repurposing) for specific purposes, using this term to describe use of materials on more than one occasion. CURVE’s identification of the purpose of reuse activity within the OU is summarised in Figure 3.2 below). This is particularly useful in establishing that reuse ‘as is’ (what might be called ‘pure’ reuse), is only one of many options.

Figure 3.2: List of ten CURVE versioning types

1) Reuse and updating:	Using previously presented material with or without minor updating of content.
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2) Reshaping	Alteration to structure or themes of a course without changing its overall size.
3) Resizing:	Breaking down a large course to smaller ones, or merging/adding to modules to produce courses of different lengths.
4) Transnational Re-purposing:	Preparing courses for sale to markets in other countries. (This often also involves reuse/updating/resizing.)
5) Sectoral Repurposing:	Altering a course to fit a specific constituency (e.g. a particular workplace/occupation or a broad societal or economic sector).
6) Level Adaptation:	Adapting/Repurposing a course to a different level in terms of a curriculum or qualifications framework.
7) Framework Re-purposing:	Reuse of the pedagogical and structural framework of a course by a different course, or a new version of the original.
8) Cross Media Re-design:	Repurposing course material for presentation through a different medium, typically CD ROMs or websites.
9) Generic adaptation:	Producing resources which are not subject specific and may be reusable within a number of different courses.
10) Preversioning:	The design of courses so that they are easy to version in one or more of the ways listed above.

(Source: adapted from CURVE, 2004)

Framework re-purposing (Type 7) referred to an approach championed by the Dutch OU

through its development of Educational Mark-Up Language (EML) (Koper and Manderveld, 2004). This emphasis on reusing structure and models of teaching and learning instead of the content influenced development of the IMS Learning Design specification.

What is notable in the CURVE typology is that several types of versioning activity have been based on repurposing existing content to appeal to new or different markets. CURVE versioning types 4-7 are clearly for this purpose, and types 2-3 may be motivated by a desire to attract new students within the same market. This market-focused motivation, directed at attracting new students, or new types of students, may be particularly relevant to OU and distance teaching. Strijker (2004) noted that most of the activity around creating, adapting and using resources identified in his research was directed not at creating new courses, but updating and maintaining existing ones. He identified motivation of instructors to reuse material as 'not so much pedagogical but rather their need to adapt existing courses to changes in the curriculum' (Strijker, 2004, p141). He suggests that this clear purpose for reuse helped users understand the benefit: 'The issue of restructuring courses made the need for reusing material and the need for ease of use clear for the instructors' (Strijker, 2004, p141-2). This is an important point, recognising that educators are only periodically involved in creating new courses, but are often keeping courses up to date with little need for radical change or large numbers of resources to accomplish this. In both Strijker's research and most CURVE versioning types, reuse activity was reactive, responding to external requirements, rather than proactive aimed at changing pedagogy. Exceptions were 9) Generic adaptation and 10) Preversioning which anticipate and seek to facilitate reuse, and 8) Cross-media Redesign which may be anticipatory, or responsive. CS4-SORRS provides an example of generic adaptation.

More recently, the OU has become known for making its resources available as open educational resources (OER), through its OpenLearn initiative (www.open.ac.uk/openlearn).

Between 2006 and January 2010 it published 6,000 hours of content under open licence (Pegler, 2010d) as resources which could be used and adapted by others. Notably it also published these into its LabSpace (an online facility aimed at educators) as well as LearningSpace (a site aimed at learners). As well as offering online 'open courseware' ready to use by learners, the OU's OER were also available as XML files to download and adapt, and share back into the OU LabSpace system (<http://labspace.open.ac.uk>). This suggests a further versioning type:

11) Open Content/OER sharing: versioning parts of a course and making these available under open license arrangements, so that they can be studied independently without registering as a student, and can also be adapted and reused by others. (See Section 3.13)

Versioning resources as OER has been linked with attracting new students, contributing to the marketing of the institution (Lane, 2009), which is consistent with other versioning approaches for this institution.

All ten original CURVE versioning types were based on the OU reusing its own content, rather than acquiring and reusing content from elsewhere. This reflected the scale and type of OU activity as an exceptionally large and distance teaching institution. It also reflected expectations in the period in which this typology was constructed, which pre-dated RLO activity within UK HE. Only in types 9 and 10 was there a suggestion of designing resource reuse in advance of presentation to students. This would require anticipation of what was required in reuse without having first addressed the efficacy of the reusable resources within an authentic learning context. Wiley welcomed the emphasis within the CURVE versioning types, on starting with the course/module, so meeting learning needs first and designing for reuse 'opportunistically'. He emphasises that: 'If the educational resources we create don't

meet our own needs well, why should we think they would meet another's?' (Wiley, 2003a, p78), reminding us that it is the usefulness of learning resources in their original context that will often most accurately determine their reuse potential, and not simply their availability in a particular format or system.

However, to reflect activity in the sector beyond the OU, and distance learning programmes, a further type of versioning should be added to the list in Figure 3.2:

12) Localisation. Adapting a course or resource made elsewhere to fit the needs of the institution, department or course/module.

Drawing on their research, the CURVE team suggested that reuse had often been costlier than remaking within the OU, noting that 'versioning can be more complex, time-consuming and expensive than starting afresh' (Thorpe, Kubiak and Thorpe, 2003, p117). They were talking here of the costs of removing course context from a course in order to reuse it, e.g. removing internal links and references). Beetham (2011), based on analysis of the JISC UKOER Phase 1 programmes, has suggested that remaking legacy resources into open resources is more expensive than starting afresh. This reveals a tension between the resources which users recognise as reusable (those with past success as learning resources) and the resource implications of changing these into formats in which resources may be effectively reusable, e.g. RLO or OER. The solution appeared, in 2003, to be to create reusable courses which were made up of RLOs, an ideal which CS1-H806 explored.

3.5 The importance of metadata

Metadata plays a key role in the description and discovery of online resources, paving the way to their reuse. It is an important consideration when *labelling* learning resources, and may be

also used when *selecting* between them. Although the start of the period saw emphasis on comprehensive standards (e.g. IEEE learning object metadata (LOM), IEEE, 2002), metadata is not equally important for all reuse contexts. It becomes progressively more important as familiarity with the resource, and the source of the resource, declines. An educator will require little formal metadata in order to select between his/her own resources when contemplating reuse, and may use few labels to describe them. A national repository, which does not have a close connection with its potential users, and may have broad multi-disciplinary scope, will need to provide sufficiently full metadata, in standardised form, to address users' unfamiliarity with its content.

Metadata has been described as 'data associated with objects which relieves their potential users of having to have full advance knowledge of their existence or characteristics' (Dempsey and Heery, 1998, p149, quoted in Clow (2004)). Unfamiliar resources are formally and fully described to allow accurate identification and location through searching or browsing. A difficult balance needs to be achieved between having enough accurate metadata to meet the needs of potential users, i.e. assisting in *selecting* as well as earlier *labelling* and *offering* activities and being able to support and sustain the effort required to supply metadata at this level.

Part of the potential of online resource reuse lay in locating, comparing and selecting resources across repositories (e.g. Duval, 2006). To achieve the necessary semantic interoperability to support federated searching across sources, there must be consistent use of metadata elements and controlled vocabularies (Campbell, 2003). The process of entering data into a library catalogue is often likened to the process of adding metadata records to a repository, although semantic markup (tagging) and standard LO metadata fields require greater familiarity with the design of the resource than would usually be required for

conventional cataloguing, and there was suggestion that adhering to the LOM standards did not generate enough metadata. Halm (2003) observed that data about learning object quality and how well the resource articulates with other learning objects was not well supported in the LOM standards. Librarians, and other information scientists, who have the necessary skill to select and apply appropriate standards, classification systems, controlled vocabularies and ontologies, are not likely to be able to provide the additional information that Halm suggests is needed. This has been described as secondary metadata and is further discussed in Section 3.5.1.

The source and type of metadata is significant if reuse is to be facilitated. Hodgins distinguishes between objective and subjective metadata:

Objective metadata is factual information, most of which can be generated automatically, things such as physical attributes, date, author, operational requirements, costs, identification numbers, and ownership. Subjective metadata is the more varied and valuable attributes of an information object determined by the person or group who creates the metadata. (Hodgins, 2000, p28)

Although Hodgins points out that some metadata could be generated automatically, and as the period progressed it more commonly was, many systems initially required manual completion of all metadata fields (e.g. CS1-H806). Automation of subjective data was not possible. The source of this was usually authors or content creators so acquiring sufficient high quality and consistent *subjective* metadata required this group be motivated to supply this. CS4-SORRS suggests that this is hard to achieve and Strijker (2004) also shed doubt on any assumption of willingness by creators to engage in this additional task. As he pointed out, they already had sufficient metadata for their own purposes:

The instructors saw adding metadata to learning material as doing “work for others”.

The added value for themselves was not seen because the instructors have the idea that they already know what they have created themselves and where to find it. ... The argument that metadata can be useful for archiving one’s own material was also not a reason that was convincing to the instructors because problems were seen in the continuity of terms to be used. (Strijker, 2004, p155)

Littlejohn (2003) offered further insight through experiences within the Scottish electronic Staff Development Library (SeSDL) (an influence on CS2-Stòr). Noting the existence of genuine problems in supplying metadata as ‘tutors had difficulty in classifying learning objects that were being uploaded to the repository’ (op cit, p227) she observed that a further implication of the time-consuming requirement for metadata was that it could: ‘make tutors reluctant to upload their own materials’ (Littlejohn, 2003, p227)

Currier, one of the project staff within SESDL and CS3-Stòr Cùram, who described herself as a ‘metaphile’, recognises that ‘heavy’ or formal metadata is often unpopular, with content creators disinclined to supply the necessary information in a consistent fashion. This affects the resource’s reuse potential, as noted in her aptly-titled paper *Quality in eLearning – Garbage In – Garbage Out* (Currier, 2004a). She referred to the Higher Level Skills for Industry (HLSI) learning object repository project, where re-editing of all 2,500 metadata records was required when it was discovered that the original metadata was so inconsistent and incomplete that it could not reliably inform searches on the repository content. Recognising the view that: ‘rigorous metadata creation is too time-consuming and costly, a barrier in an arena where the supposed benefits include savings in time, effort and cost’, Currier, *et al.* (2004, p8) suggest a pragmatic division of the task, with the educational practitioner responsible for the ‘basic metadata’ (title, description, contribution and any technical

information), while the information scientist is responsible for reviewing the basic metadata and providing additional metadata for subject classification, educational attributes etc.

This suggestion does not, however, address the more exacting requirements mentioned by Halm (2003). It also assumed that the expense of a metadata specialist was acceptable as a standard operating cost for repository services. This is less helpful as a solution to deposit of resources contributed in a more distributed fashion rather than through a centralised team, a trend which increased as the period progressed. McNaught. *et al.*, (2003) suggest that the role of metadata is important, but in the category of 'necessary but not sufficient'. This view would suggest that it would not motivate reuse, although poor metadata might impede or prevent reuse occurring.

Automated metadata, and less formal tagging of content, has increasing found popularity as an approach to collecting metadata from what Plockley (2004) termed the 'Creatives' and 'Educators'. Clow (2004) identified the 'light approach' to metadata as metadata collection at the time of depositing the resource, and set as the minimum readily (preferably automatically) obtained, employing 'light' software techniques, equivalent to those used to rank Google searches, to help overcome problems of consistency and resource discovery. However while this fulfils the basic metadata functions of classification it cannot provide a rich description. Duval and others (Wolpers, *et al.*, 2007) have suggested that 'attention metadata' (e.g. noting what music was listened to, or what other sites used) could be collected automatically as one solution to tracking and obtaining context about the creator or users. This has not yet been tested within practice and could, as have data-mining approaches, attract criticism on the basis of security and privacy.

3.5.1 Secondary metadata

Acquiring sufficient primary metadata (supplied at the time when the resource is deposited) was challenging, but as Halm suggested it was also insufficient. Metadata which contains information about the resource *in use/reuse* is missing. When a resource is a new and untested any subjective metadata may be regarded as provisional and incomplete until after use/reuse has occurred. Williams (2000) pointed out that although learning objects may be defined in isolation they:

can only be employed as such in instructional situations and contexts ... what constitutes an actual learning object as part of instruction in a given context [and] must be defined by users of that learning object for it to have useful meaning for those users. (Williams, 2000, p16)

As a learning object is designed to be used in many different contexts Williams argues that 'it's usefulness should be documented by many users with different needs and perspectives in many contexts over time and that product evaluation information should be attached to the object as metadata' (op cit, p18). He points out that no single evaluation study could provide this kind of information. Neither is it possible for the original creator of the object to provide (nor anticipate) this range of perspectives and experiences. Reviews and comments within Web 2.0-based repositories such as CS3-LORO may address this gap, although this form of metadata may not be accessible to federated searches across repositories. Access to the repository for user comment also needs to be balanced with appropriate measures to prevent addition of SPAM, which has been the case with OU OpenLearn.

Recker, Walker and Wiley's suggestion that reuse would be further facilitated by what they termed "'non-authoritative" metadata' (Recker, *et al.*, 2000, p3) predates the arrival of Web 2.0-based repositories but addresses some of their features. Contributors would add non-

anonymous descriptions of 'distributed digital learning objects' (op cit, p3) (i.e. those located outside formal repositories). Wiley (2003c) suggested a more radical model of discoverability where: 'Individual resources are discovered through "community queries" in which community members respond with pointers to resources they know about personally.' Community review of learning objects would be the online equivalent of the 'word of mouth recommendation' that Barker, *et al.*, (2004) noted as one way of judging the quality of e-learning materials. Although any such evaluation (rating) is subjective, contextual and dependant on the expertise of the reviewer, it addresses McGreal's concern that:

the usefulness of a LO can best be evaluated once it has been placed in at least one specific learning context. Once it has been proven to work in one context, it can be better expected to be of use to some others (McGreal, 2004, p13).

This is a broadening out of the email or face-to-face approach to colleagues requesting advice. At the start of the period there were concerns that the information literacy of the searcher and the effectiveness of communities communicating across boundaries (Wenger, 2000) would create barriers. These could favour active community 'insiders', well-informed and skilled internet users and exclude community 'outsiders' or novices who might benefit significantly from engagement with reusable resources. There is no longer such a significant divide. Use of social networking systems such as Twitter, social bookmarking, RSS feeds, and engaging with online reviews, comments and ratings systems, is an increasingly common experience across UK HE and widely used by HE users for other activities. Some of the newer repositories invite user reviews and comments (e.g. HUMBOX (www.humbox.ac.uk), based at Southampton University and connected to CS3-LORO). LORO engages strongly with a community of users, while Case Study 6: NDLR (CS6-NDLR), as a national resource service, supports not only a repository but also the activity of numerous communities of practice. Both approaches not

only enrich the metadata (in a wide sense), but also provide opportunities for feedback to reusable resource creators.

Peer review is only helpful for resources which attract comment. The MERLOT (Multimedia Educational Resource for Learning and Online Teaching) repository has an established formal peer review system, however experiences there suggest problems of timeliness of comments and scalability of the system (Kestner, 2004). Hanley (2005) noted that only a minority (14%) of the material submitted had been reviewed (CERI, 2007).

Whatever the system of providing metadata, whether for distributed learning objects or a repository, it needs to address key problems of 'cold-start, sparse review set, and scalability' (Recker, *et al.*, 2000, p19) if it hopes to attract reviews, but offers no explicit incentives to contributing these. As noted in those cases where formal management of metadata was attempted (CS2-Stòr, CS3-L₂O and CS4-SORRS) there was an overhead cost to maintaining this. However in cases where no formal metadata was required (CS5-PROWE), or no formal check on creator-generated metadata occurred (CS1-H806), the quality and consistency could be inappropriate. Resolving the problem of who should provide metadata, when, how and why it should be provided, continues to be a challenge to resource reuse, only partly addressed by technology.

3.6 Reuse or *repurposing* of learning objects?

Boyle (2003) used the term 'repurposable learning objects' rather than 'reusable learning objects', and others have suggested that there could be changes to resources shared, rather than reuse 'as is' without modification. Repurposing could range from minor alteration in style (e.g. changing the position of brackets within a Java code display (Boyle, 2005)), or more substantial rewriting, to create a new-looking resource. Some changes, such as updating of links to external websites, would be necessary as online digital learning resources mature.

Resources that rely upon topical information for accuracy, referring to law or policy in fast-moving areas, may suddenly become out of date. Responsibility for updating, and whether this lies with the repository, or the user, was identified as an issue within several cases so is commented on more fully in Chapter 6 (CS2-Stòr and CS4-SORRS). It is sufficient here to note that some repurposing may be necessary rather than discretionary.

Evidence from CS1-H806 suggested that repurposing is likely to occur even where the resources are being reused by their creators, within the same institution, and within a period of twelve months (i.e. not driven by updating). These changes related to several CURVE versioning levels (Figure 3.2), and were driven by the desire to recontextualise for the new audience. Given that CS1-H806 reuse occurred within the same institution, reuse in other contexts (e.g. beyond an institution, or transnationally), without at least minor modification, seems unlikely, confirming Boyle's suggestion that repurposing was the more appropriate term. Towards the end of the research period the work of the RLO-CETL, which Boyle headed, focused on creation of a 'generative learning object' tool and sharing practice around creation of this type of learning objects. This tool anticipated creation of *repurposable* multimedia learning objects rather than ones which were only open to reuse.

Towards the end of the period, recognition of repurposing rather than, or alongside, reuse, underlay a drift in expectations around reuse. Borrowing from the terminology of object-orientated programming, RLOs were, like programming objects, initially assumed to not require further modification by the end user. The analogy of the Lego block helped inform this thinking (Wiley, 1999) emphasising that you could not change the component (learning object or block), but you could change the arrangement and choose alternative blocks to replace ones previously used. Within this logic there was no need to change the form of the object itself. This view guided corporate implementation of RLOs (e.g. Barritt and Alderman, 2004), and

even when replacing the Lego metaphor, Wiley (1999) does not assume repurposing of the atom. The focus for RLO researchers was on what could be done *with* the RLO, rather than what could be done *inside* the RLO. The RLO itself was not expected to change. Rather than updating an existing resource, a replacement would be found.

3.7 Granularity – emphasis on size

The ‘size’ of the reusable learning resource, often measured in terms of student activity (time), has frequently been linked to its reuse potential. RLOs with a higher degree of granularity (smaller resource size) were considered more reusable than those of lower granularity (larger size). While within HE there has been no consensus on optimal levels of granularity, within the training sector very small segments, e.g. 5-15 minutes of activity, have been suggested as optimal (Robson, 2001).

Wiley, Gibbons and Recker (2000) using a work model complexity approach suggested ‘a semi-linear relationship between the relative size of the learning object and the relative complexity of the content whose learning the object is meant to support’. This view highlights the importance of the context and purpose in arriving at an appropriate definition of granularity. This perhaps explains why within HE, a more challenging educational environment than most training contexts, more extensive learning objects, e.g. ‘compound learning objects’ (Boyle, 2003) or ‘holistic learning objects’ (Mason, *et al.*, 2005) have proved both reusable and effective.

South and Monson (2000) identified and illustrated a trade-off between the levels of granularity which had greatest utility for the media developer and greatest utility for the instructional developer. Their illustration suggested that a compromise was necessary. What worked best technically may be smaller resource size, allowing aggregation and supporting

greater variety (permutations), but larger objects provide best instructional context. CISCO's white paper on reusable learning object strategy observed: 'The size and shape of an "object" is open to each organisation to define. This decision is based upon the needs, tools, processes, and business goals of the organisation' (Barritt, 2001, p4).

Single images with or without caption are sometimes seen as a near perfect learning objects, content stripped of context (e.g. Downes, 2000). Conveniently granular for the developer yet with relevance as a single resource within many instructional contexts, they are often used as examples of what a reusable learning object is (e.g. Sosteric and Hesemeier, 2004, Figure 2.1, p34). Besser quoted in Conole, *et al.*, (2003) observed:

unlike a book, an image makes no attempt to tell us what it is about. Even though the person who captured an image or created an object may have had a specific purpose in mind, the image or object is left to stand on its own and is often used for purposes not anticipated by the original creator or capturer (Besser, 1990, p788).

In some disciplines the reuse of single images was well established before digitisation. Slide libraries in Art Departments provide one such example. However single images illustrate a significant tension between granularity and reuse. The potential for reuse may be very varied which creates problems of classification. As Mason (2005) pointed out, the greater the granularity (the less 'holistic' the learning object), the more metadata is required, leading to 'metadata more comprehensive than the object itself in order to identify material for reuse' (Mason, 2005, p214). Keister (1994) noted, when writing about automated picture retrieval:

It is not so much that a picture is worth a thousand words ... The issue has more to do with the fact that those words vary from one person to another (p17).

Thus, what may at first appear the most unproblematic of reusable resources, attracts

particular problems for *labelling* and *selecting*. The same problems, of description, categorisation and balancing effort saved against effort expended (for user and supplier of the resource), relates to any resource which is context-free or generic, so reusable across diverse contexts. The effort required to describe small de-contextualised resources, using human-generated metadata, may be particularly challenging if there are many resources to be shared at the same time (e.g. an image collection).

Barker, *et al.* (2004) noted that many users suggested that individual digital assets were the most straightforward resources to reuse. They hypothesised that this explained the reuse in FE and HE of repositories such as SCRAM, a collection of digital images for Arts and History, maintained by the Royal Commission on the Ancient and Historic Monuments of Scotland. However, within the same report they also suggest that reuse arose 'partially because the IPR issues are less complex when dealing with individual assets, but also because [these] lecturers and teachers are already familiar with the idea of drawing on collections of assets' (Barker, *et al.*, 2004, p14). Users of SCRAM resources are already adept at reusing granular resources of the single image type, and could transfer established practices to a new format. This offers an alternative explanation for the success of SCRAM and is consistent with theory about diffusion of innovation, i.e. adoption is quicker and simpler when it is compatible with existing methods and techniques and there is a relative advantage in comparison with the established practice (Rogers, 1995). Appropriate granularity may therefore not always be small, but could simply reflect the size of resources already familiar to users. This will not require the development of new practice, or adaption to re-size resources before use. None of the six cases in Chapters 5-6 was concerned only with sharing resources in highly granular form although CS3-LORO (Section 5.4) included single photographs within its repository. However in the LORO disciplinary context, Language teaching, as with the Art slides example, this was familiarity with single image reuse by Language teachers using this service.

3.8 Emphasis on reusable multimedia resources

Many researchers have pointed out the high costs of creating *quality* digital resources (e.g. Bates (2005) had reported one hour of effective multimedia instruction as requiring over 100 hours of developer time). Others have drawn attention to the implications of scaling up online teaching (e.g. Weller, 2002). Creation of high quality multimedia, has often been hard to justify for single institution use. Arizona Learning Systems estimated that a three-unit online course based cost \$12,000 if text-based, whereas one based on simulations cost \$250,000 (Weller, 2004). Unsurprisingly many examples of the potential of RLOs emphasised sharing multimedia. In introducing RLOs, McGreal asks us to 'Imagine having seamless access to a vast store of learning resources such as animations, videos, simulations, educational games, and multimedia texts in the same way that Napster users have access to music files' (McGreal, 2004, p1).

In UK HE, the RLO-CETL, the focus of sector activity around RLOs, based its outreach workshop activity around creation of multimedia learning objects. It also developed an evaluation tool for RLOs based on interactivity which was particularly appropriate to multimedia resources. The tool, GLOmaker, allowed easy creation and reuse of generative learning objects which were multimedia in form. CS2-Stòr developed primarily multimedia learning objects (six of the seven items selected for testing were multimedia).

This emphasis on multimedia format in the supply and creation of learning objects, contrasts with what most educators will create and use. Those resources will be predominantly text-based, or otherwise technically simple. Figure 3.3 supports within the NDLR.

Figure 3.3: NDLR Survey: resources available for sharing

Type of resource	No.	%
PowerPoint presentations on 'core' topics in your subject	40	82%
Digital images e.g. from a digital camera	26	53%
Worksheets designed to support learning in a topic	21	43%
Quiz questions	13	27%
Do not currently have items suitable for adding to the repository	9	18%
Other items listed in comments to this question:		
Flash animations, Excel materials, Dynamic quizzes, Video extracts, Audio recordings, Podcasts, LaTeX files, Data sets, Exam papers and solutions, Students' projects, Assignment briefs and tasks, Concept maps, Two corpora in French, Applets, Software for timetabling and student attendance, Elearning module, Maple files.		

Source: NDLR User Needs Analysis, 2006, in Workpackage 1: Evaluation (User evaluation and external evaluator), Final Report, 2008, Appendices to Final Report, p85

This presents an imbalance, between what users can supply from their existing practice, and what funded projects supply and facilitate reuse of. This could be due to several factors:

- **Effort and resources expended** in locating and evaluating multimedia is likely to be less than that spent creating it, even if the skills are available to create it.
- **The range of alternatives is relatively limited** so there are fewer alternative examples to evaluate. While this apparently reduces the time to select between alternatives, CS2-Stør suggested that evaluation of multimedia could be particularly time consuming.

- **Multimedia is a relatively scarce resource and one which will usually be visually appealing** which could attract users to try out a repository or service.
- **Emphasis is placed on reuse rather than repurposing**, as the end-user is unlikely to have the skill or resource to make changes, suggesting cost-effective reuse.
- **Replacement is not of like with like**. As multimedia resources are infrequently reused the RLO would either contribute an additional resource, or replace a resource which was not multimedia. This may be more acceptable to users as it does not suggest inadequacy in the replaced resource.

In emphasising reuse of multimedia the RLO-CETL and other reuse initiatives were addressing an area of scarcity within UK HE. Not only the resources, but the skills to create these, were in short supply. South and Monson (2000) pointed out the difficulties of hiring and retaining digital media designers within US universities because of high demand for their skills, shortage of suitable staff and the relatively low wages offered to academic support staff in higher education. Within UK HE this problem persists, with many e-learning initiatives funded as 'projects' linked to fixed term staff contracts.

3.9 Generic and context-free resources

Longmire suggested that learning objects should be 'unitary' (Longmire, 2000) while Robson suggested that it is not the small size of granular learning objects that determined their reuse potential, but their relative freedom from embedded context or their openness to alternative contextualisation.

In practice, LOs with lower contextual value can be reused more. This has led a number of authors to observe that there is an inverse relationship between the 'size' of a LO and its potential for reuse ... But it is not 'size' that matters. The real issue is context.

Information objects with larger contextual components are generally less reusable.

(Robson, 2004, p164).

Robson was suggesting that heavily contextualised RLOs presented a diminished opportunity for reuse. His was a commonly held view in favour of generic resources which assumed reuse occurred in unmodified form, rather than through repurposing. Robson's view was consistent with RLO design approaches that suggested that contextualisation be provided as an additional layer, rather than embedded within, the learning resource. Wiley, in on several occasions describes this as 'mortar' (Wiley, 2002 and Wiley, 2005). In CS1-H806 this was achieved through additional 'narrative' learning objects, with the authors recognised as a special less reusable form of RLO (Weller, *et al.*, 2003).

To create the appropriate pedagogical neutrality in existing resources, sufficient to facilitate reuse without modification by users, required additional effort by the supplier or creator. They needed to remove contextual information and in their usual workload there was no reward or time allocation set aside to do this to resources created earlier. For new resources, creators were asked to modify their approach in resource design and authoring, by writing in a context-free 'generic' style. However as the period progressed there was less confidence in reuse on the basis of context-free resources and increasing interest in repurposing resources which had been shown to work well within a specific context.

Boyle (2003) distinguished between the cohesion (internal focus on a single learning objective) and decoupling (structural independence) of learning objects, valuing these attributes in

concluding that compound learning objects can have reuse value. He describes the challenge and benefit of making RLOs which are pedagogically rich rather than barren:

It would certainly be possible to create a list of learning objects that are cohesive and relatively decoupled, but are also pedagogically barren. We must face the challenge of creating learning objects that are cohesive, decoupled and pedagogically rich. This design challenge is associated with the issue of 'repurposability' as we might expect rich learning objects to provide further options for adaptation by local tutors (Boyle, 2003).

Pedagogically rich, cohesive and decoupled compound learning resources of a non-digital form (e.g. print-based Harvard Business School cases) had previously been used in UK HE, sometimes with minor repurposing by the educator using them (e.g. changes to assessment questions). Such reuse suggested that adapting and re-contextualising even context-rich resources need not be onerous when the resource is delivered within blended elearning as part of face-to-face delivery, which is often the case in UK HE.

3.10 Copyright and the creative commons

Although frequently referred to as 'copyright', since reusable digital learning resources may incorporate a variety of media it is more accurate to talk of intellectual property rights (IPR) or 'rights', which include, but are not restricted to 'copyright'. Copyright suggests emphasis on the circumstances in which copies of an original resource can be generated – for example the proportion of the document that can be quoted or replicated under 'fair dealing', the numbers of copies that can be created, or the requirement to acknowledge the resource creator. IPR covers patent law and computer code, so has its origins in concerns about also controlling adaptation of the original. Both copying and adaption are concerns relevant to reuse activity.

The penalties for infringing rights within UK HE include civil and criminal prosecution and can extend to the institution (for facilitating distribution) as well as to individuals directly involved. However the Gowers Review on Intellectual Property noted that copyright in the UK suffered from what they called 'a marked lack of public legitimacy' (Gowers, 2006, p39). IPR as it related to reuse of resources in teaching was regarded as unnecessarily restrictive and inflexible, and was ignored 'with little guilt or sanction associated with infringement' (op cit., p39). Many acts of infringement were hard to detect and this Review noted that infringing behaviour was often regarded as legitimate and not likely to damage the rights holders. Much of the educational content reused in HE originated within the university sector and was therefore publicly funded. Potential users through application of 'fair dealing' and Copyright Licencing Agency agreements were unlikely to be required to request permission to reuse copyrighted work as part of conventional campus-based teaching. However, if HE staff wished to share or reuse resources online beyond the registered students within their institution, and these resources included content with third party rights, they would need to apply and obtain permission from the rights holder, and appropriately acknowledge the source, before proceeding to reuse.

Obtaining permission to reuse copyrighted resources online is not straightforward and may take considerable time. It may not be clear who owns the rights. For example, Farrington (2002) noted that the publication of teaching resources online can create uncertainty about whether the institution or the lecturer owns the rights in these. A UK survey by the JISC-funded Rights and Rewards Project, in 2005, reinforced that view, finding that 54.9% of respondents were unsure of the answer (Loddington, 2005). For this thesis, who owns the rights is not of particular concern, but that these resources are protected by rights legislation unless explicitly waived by a rights holder (who may be difficult to identify), is noted as a potentially significant barrier to either using or sharing resources online.

Many websites will not contain rights information about the resources held within them and the British Library has estimated that 40% of all print works are 'orphan works' for which it is not possible to clear the rights to reuse, as the rights owner is unknown or untraceable (Gowers, 2006, p69). Practical problems occur in clearing rights even where the rights holder is identified and traceable. Casey (2006) reporting on the JISC-funded TrustDR project noted significant problems within the earlier JISC-funded Learning to Learn (L2L) Project (2002-2006) '(which was not unique to L2L) was the considerable time and effort required in attempting to obtain copyright clearance' (Brosnan, 2005, p10). Educational projects are often not intending to pay for rights clearance so there is no financial motive to answer their emails, address their queries or grant rights to reuse. L2L received no response from several of the copyright holders they contacted. During 2008/9 JISC RePRODUCE projects found that rights holders (usually individual academics) who initially agreed to permit reuse were then reluctant to commit to a legal licence formalising the terms of that reuse (Williamson, 2009). With copyright automatically coming into force in the UK, as soon as a resource is published (i.e. made visible to others), rights owners may, through oversight or uncertainty, obstruct reuse without actively intending to. During the early part of the research period, the various barriers presented by understanding, recognising and complying with rights legislation was repeatedly identified by reuse projects as a major barrier to progress. For reuse of legacy resources, not re-released as OER, this has continued to be a barrier.

The emergence of repositories offers a partial solution. These are convenient sources of rights-cleared resources, which will not usually accept for inclusion resources which contain third party content without assurance that the rights are appropriately cleared. While repositories are not a direct remedy for those who have legacy material for which they need to clear rights for wider or online use, they may offer substitutes for some of the 'offending' content.

While the requirement to clear rights before reuse is based on the idea of protecting the economic rights of the creator, or rights owner, the Gowers Review noted that only 2% of copyrighted work is commercially available. With many works no longer in print, permission to reuse copyright content would frequently cause no economic harm, but it can still prove uneconomic to undertake the process of seeking or granting approval to reuse.

Creative Commons licenses, and other open licenses, offer some resolution of the problems identified above. Attaching an open license to a work indicates that the copyright owner agrees to reuse occurring. It also identifies in advance specific restrictions on that reuse. This does not replace copyright, which continues to exist, so the copyright owner will still be identified (attributed) when the resource is reused. Potential users can search for resources which carry a particular open licence (e.g. one which allows modification (repurposing)) without needing to contact the rights owner. Users may focus on repositories or other sources, e.g. OpenLearn, on the basis that the materials within it are known to allow modification in reuse. That is, *searching* can be directed initially by rights information to ensure reuse is possible before selecting appropriate content. With funders such as JISC requiring release of content using open licenses through its OER programme (JISC, 2008) more resources have become available with a reuse-friendly rights status. Although the availability of resources licensed for reuse does not address the problem of legacy resources which are not licensed openly, it offers a new model for future practice which will address one of the more intractable problems preventing reuse.

Announcing plans in 2008 to make Jorum, the UK National repository 'open' by creating JorumOpen to handle resources licensed under Creative Commons, John Casey, Learning and Teaching Manager at Jorum and veteran of several JISC repository projects, made clear the importance of IPR awareness by potential resource users: 'IPR should be viewed as an essential

part of individual academic integrity and institutional quality control' (Casey, et. al. (2008). He has also suggested that 'confusion, lack of awareness, poor practice, contradictory policy and risk aversion' dominate thinking on IPR across all levels of staff in HE (Casey, 2008), describing IPR as a 'lightning conductor', a focal point for individual and institutional anxieties about ownership, status, power and control in relation to resources. When resources which were previously used only with students become visible to others it makes previous poor IPR practice visible. This can act as a deterrent to sharing resources for reuse, or even placing these online. Thus uncertainty about rights can slow progress in sharing resources as well as using them.

Strijker (2004) in research covering university, military and corporate contexts found that some discipline settings were more successful than others in promoting reuse, but in general;

If the instructor does not perceive the return for his time and effort investments, he will not bother ... The decision maker, designer, instructor or learner needs to feel that the balance [of] the many factors involved must be "positive enough" to justify the efforts.
(p5)

Mason, referring to CS1-H806, noted that sharing within the institution may offer a better return on investment in time to clear rights. Intra-institutionally permission of the creator will usually be requested as a matter of politeness, but it is easier as 'we have no barriers of IPR within the University' (Mason, 2006, p214). This suggests that local sharing may be easier to achieve than sharing inter-institutionally, at least for legacy content written without an open license. Initiatives such as JISC's 2011 e-Content programme (JISC, 2011), the latest phase of a £22m programme has been aimed at improving availability of online collections and resources for Further and Higher Education in the UK, primarily legacy rather than new content. This required release of some content as OER, but also noted an overriding principle:

As a general rule the JISC does not seek to retain IPR in the project deliverables created as part of its programmes. However, funding is always made available on the condition that HEFCE is granted by the digital content owner(s) a non-exclusive licence in perpetuity. Such a non-exclusive licence will give HEFCE the right to make the digital content available to the UK Further and Higher Education community. (p11)

The e-content programme does not assume that modification or repurposing of its content will be available, so it is more likely to support reuse, rather than repurposing, but its guidance does indicate an on-going policy-level commitment to addressing the rights problems which have in the past prevented JISC projects from reusing resources, even those which were created, as Earney (2009) noted, been created with public funding.

3.11 From Learning Design to Open Practice

One criticism of the emphasis placed on reusable resource characteristics (e.g. RLO or OER) has been that this reinforces emphasis on reuse of *content*. This could deflect effort from developing practitioner skills in online design practice, which is an objective often associated with reuse of online resources (e.g. CS2-Stòr). A growing emphasis during the research period has been on capturing and reusing learning design, as well as resource reuse. Although reuse of learning design is not of primary concern within this thesis, resources, particularly complex ones such as open courseware, can supply illustrations of online pedagogy. When educators consult resources for ideas and inspiration these can be design ideas. One of the values of OER activity is that it makes practice visible (open) to people other than the original teacher and student participants which supports sharing of practice *and* content.

The challenge of how best to represent learning design followed a similar path to that taken by learning objects. By 2004, Downes was lamenting that what was happening was ‘nothing like the automated course creation tools some of us may have envisioned when the specifications first rolled off the presses half a decade ago’ (Downes, 2004), noting that the IMS Standard for Learning Design (LD) based on the Educational Modelling Language developed by the Open University of the Netherlands could not be automated. However, interest in developing standardised ways of representing learning and teaching activity continued, based on the IMS LD principles of representing interaction between actors (participants), activity and resources. The Learning Activity Management System (LAMS) led by James Dalziel offered an early lead in representing learning activity (<http://lamsfoundation.org/>), and influenced UK-based activity, notably the development of LD-influenced pedagogy planning tools such as PHOEBE (<http://phoebe-app.conted.ox.ac.uk/>), Compendium LD (<http://compendiumld.open.ac.uk/>) and Learning Design Support Environment (LDSE) (<https://sites.google.com/a/lkl.ac.uk/ldse/>). Such initiatives offer guidance on how to use/reuse resources online in ways which are consistent with the learners, learning objectives, and learning environment, while encouraging sharing of practice. They can support relatively inexperienced online educators in creating effective designs incorporating reusable resources.

EU-funded initiatives such as OPAL (Open Educational Quality Initiative) seek to support: ‘articulation and use of Open Educational Practices (OEP) that surround OER [which] will lead to better quality and innovation in the development and use of OER’ (OPAL, 2010, p.8). The relationship of open practice and OER can be seen as analogous to the role of IMS Learning Design and RLO, but without the emphasis on automation. The OPAL objective is consistent with and supportive of the EU’s Open eLearning Observatory Services (OLCOS) Roadmap 2012 (Geser, 2007) which offered a vision that by 2012:

re-use of resources will be a routine practice ... Teachers and tutors will have the skills and tools to easily modify, combine and repurpose useful material ... With respect to Open Educational Resources, teachers will not simply be “end-users”, as they understand the importance of continuous questioning, evaluation and improvement of educational practices and resources. (Geser, 2007, p118)

3.12 Interoperability and standards

A range of IMS reuse-related standards have been in development throughout the research period. Standards advocates emphasise their helpfulness, suggesting that they support a range of *ilities* (Acker and Voltero, 2002), that is they make things possible. McGreal (2004, p1-2) lists Learning Object ‘abilities’ as:

Figure 3.4: ‘abilities’ supported by learning objects

Accessibility	Easy to access
Interoperability	Working across platforms with different tools
Adaptability	Tailorable
Reusability	Incorporable into multiple applications
Durability	Still easily useable when base technologies change
Affordability	Reduced time and costs
Assessability	Of pedagogical effectiveness, price and usability
Discoverability	Locatable components using simple understandable searches
Interchange ability	One component can be substituted for another.
Manageability	Components can be handily found, replaced and substituted.

Source: adapted from McGreal, 2004 (pp1-2)

As one example, interoperability standards control the connections between systems (e.g., the links between a student information system and a course delivery system) for data exchange, or when adding to or strengthening system functionality by integrating external tools (e.g. new communication tools or specialised statistical packages). As recently as 2004, European elearning experts were identifying lack of interoperability between systems as a barrier to sharing and reusing content: 'The development and adoption of Europe-wide standards for tools and learning objects, describing how they fit together semantically and not just syntactically, is seen as being a key priority for EU action' (EU, 2005, p4). Interoperability allows scope for flexibility and choice, enabling migration of data and resources rather than locking a HEI into a single system.

While agreeing standards was a worthwhile objective, the impenetrability of standards documentation was not helpful to those not involved in drafting them. Downes (2004) recalled that in 1999 he tried to share his excitement in the new learning object metadata standards with his co-workers: 'The web page designer picked it up, thumbed through the hundreds of pages, and put it back on the desk without comment. The course designer wrote me an email saying, essentially, "I don't know what this means"'.

Even researchers and innovators such as McNaught (2003, p207) admitted 'I must confess that I feel a little daunted when I read standards documents. I am concerned that the technicalities of reuse will make it unattractive to academic teachers'. So, while standards work informed some examples of microenvironmental activity (e.g. CS2-Stòr drew on accessibility standards work, and CS1-H806 benefited from the partial interoperability achievements of the UKeU systems), this has been activity with which many reuse projects and most users remain unfamiliar.

3.13 Open educational resources

The Centre for Educational Research and Innovation (CERI) has identified OER as ‘digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research’ (CERI, 2007, p10). Hylén (2006), a researcher within CERI suggested that the two most important aspects of openness are ‘free availability over the internet, and as few restrictions as possible for the use of the resource’ (he advised that users should not only be able to read or view it, but also ‘adapt it, build upon it, and thereby reuse it’). The precise meaning of the word ‘open’ is however subject to different interpretations. Fleming and Massey (2007), writing for a UK HE audience, commented that definitions were evolving, and varied according to the context:

For example, ‘open source’, ‘open access’ and ‘open content’ each have different meanings for ‘open’. For ‘open access’ material this means it is made available free for all users; the term ‘open’ describes the mode of delivery. For ‘open source’ software and ‘open content’, the term ‘open’ refers to the type of licensing model which is being used. (p2)

Flemming and Massey noted that Open Educational Resources (OER) is a more recent term than the others and originated following the launch of MIT’s OpenCourseware project. However, OER in the UK not only describes ‘open courseware’ (relatively complex resources often a version of an existing lesson or learning activity, e.g. OpenLearn (<http://openlearn.open.ac.uk/>)), but also more granular resources. The term OER can be used to describe: ‘A variety of objects and online materials ... from courses and course components, to museum collections, to open access journals and reference works’ (CERI, 2007, p31). McAndrew, *et al.*, (2009) point out that OER and open content are terms which are used within

UK HE interchangeably, although open content can refer to work beyond that arena, with neither term being ‘instantly understood by users’ (p3).

It has been suggested that open educational resources are reusable learning objects with an open licence (Wiley, 2009, Robertson, 2010). This does not imply that they are learning objects in the sense of a strict Category 1 definition (Figure 3.1), but that they are available for learners and educators in a format which can be reused or repurposed.

OER have the potential to impact on the learning and teaching experience for registered *students* by providing additional choice, and they are also seen as increasing educational opportunities for non-formal or informal *learners* without the resources to pay for study. This was not one of the motivations for making resources reusable in the RLO sense, so suggests a significant shift in the motivation for supply for reuse in this form. Sharing in the form of OER has been linked to the desire to address social inequality, (Wiley, 2006, OECD, 2007), whereas, as noted in Section 2.5, RLOs had been viewed as a possible source of income, a route to addressing operational inefficiency, and a route to changing teaching practice. Tuomi (2006) made the point that a high level of openness ‘blurs the traditional distinction between “consumer” and “producer”’ (p26) suggesting that the nature of use and reuse of digital online resources changes when these are fully open.

So, while building on the lessons of RLOs, and addressing one of the major barriers identified in reusing these (IPR), OER *are* learning objects with open licenses. However when the open licenses permit derivatives, they also invite further production and sharing, which could address problems of contextualisation and updating not just for the individual (re)user, but also for the wider educational community if these new versions are themselves shared openly.

McAndrew, *et al.*, (2009) describe one such example where a Brazilian University, UNISUL, translated OpenLearn content into Portuguese, shared the result under an open license and then proceeded to share resources unconnected with the original as open courseware. This suggests that reuse using OER may become a more active process, as Tuomi suggested, although there are currently too few examples available to predict the impact of OER on UK HE practice as a new style of reuse.

This thesis regards OER as reusable resources, with different characteristics to RLOs, but created with some of the same objectives, notably to make them more reusable and, in some cases, repurposeable. Facilitation of reuse of OER has become the objective of projects which initially focused purely on sharing resources in less open ways (e.g. CS3-LORO and CS6-NDLR).

3.14 Conclusion

The research period was one which saw change and drift in the interpretations of ‘learning object’, ‘reuse’ and most recently ‘open’. Researchers who appeared to be approaching the same reuse challenge frequently did so from different perspectives on what would be the best outcome. Rehak and Mason (2003) suggested there was a ‘trajectory’ which new concepts followed, identifying five stages which they also noted as happening with the (then) new concept of learning objects. The same trajectory could be applied to understanding of reuse and openness:

- initial confusion about what the phenomenon actually is
- division of the stakeholders into two camps – enthusiasts and detractors
- gradual realization that the phenomenon is not really new, but has precedents and familiar elements
- serious investigations into how to apply, understand or exploit the concept

- acceptance as the concept finds its place somewhere between the useful and useless poles. (Rehak and Mason, 2003, p20).

Rehak and Mason's trajectory has some similarity to Tuckman's well-established model explaining the dynamics of group or team working (Tuckman, 1965). This suggested that forming, storming and norming phases would be experienced before reaching the performing stage with some groups revisiting phases, or staying within them without moving to the productive performance phase. It could be argued that this, stalling stage, is what happened with the adoption of RLO.

Rather than being a learning and teaching innovation that individual academics could adopt, independently, in order to 'perform', RLOs required specific and unwelcome effort (to add metadata, to re-size, to de-contextualise, to reformat). Suppliers of the resources and reuse services (who could themselves be time-pressured teachers) had to accept that this additional effort was worthwhile for the new styles of systematic reuse to occur. Progress towards widespread adoption of RLOs cycled between Tuckman's three initial stages *forming* (polite agreement of the rules), *storming* (disagreement about the best course of action) and *norming* (attempting to agree the best way forward). Participants in the early stages of the learning object lifecycle (those informing practice in *obtaining*, *labelling* and *offering* activity) have often been educational technologists, and not typical of the participants who are expected to 'perform' (*selecting* and *using* the resources). Early discussions about reusable learning objects emphasised the technical concerns, e.g. granularity, metadata standards and interoperability, reflecting the concerns of educational technologists who anticipated and desired an automated system. The next wave of participants engaging with RLOs comprised repository managers and project staff with different interests (e.g. rights, licenses, recognition, collecting metadata). Again the solutions to these problems were often technical. It has been relatively unusual for a reuse initiatives to involve 'end users', either academics or students, in the

planning or implementation of repositories, although CS6-NDLR and CS3-LORO, the most recent repository case examples have done so. Ip, Morrison and Currie remarked on this gap between the learning technology community and the education community:

the education community is not interested in issues of reuse, grain size, technical properties or even 'learning object'. ... Frankly 'learning object' makes no sense to the educational community. (Ip, *et al.*, 2001)

While confusion progressed to acceptance regarding many of the principles underlying reuse of online digital learning resources, following the progress suggested by Rehak and Mason, ongoing confusion about the form of learning resources and the nature of reuse persisted beyond the initial phase, and was subsumed into the challenges of a new reuse concept, OER.

Chapter 4: Research approach and case selection

4.1 Overview of research

Resource reuse can occur spontaneously, as a result of unplanned individual, independent effort, or it can occur as a result of project, institutional, sector or discipline initiative established with the intention of facilitating reuse. However, for the purpose of small-scale research directed at theory building or understanding reuse, the opportunities to observe and learn from unplanned reuse at the individual level, through study directed at this style of reuse are limited. There may be no record of the activity after the event, users are difficult to identify and reuse occurrence is necessarily unpredictable within non-formal or informal reuse contexts. This creates challenges of who to draw on for research and where and when to direct research effort. More significantly, it was the facilitation of resource reuse through mesoenvironmental activity directed at addressing macroenvironmental drivers, which is the concern of this thesis. The growth in access to repositories and less formal sources arising from online digital resource generation can support both formal (intended) reuse *and* informal or non-formal sharing and use. Therefore, resource reuse arising from formal facilitation projects can provide research access to a mix of both planned and unplanned reuse examples. Having identified resource reuse as a potential solution to challenges within UK HE, understanding how, or whether, new approaches to supporting digital online resource sharing and use occurred could be best achieved through study of reuse facilitation initiatives, particularly those which were also open to non-formal as well as formal use. A case-based research methodology met the requirement to investigate and interpret a contemporaneous phenomenon as it occurred in a dynamic and evolving practice environment.

This chapter sets out the overall methodology, constraints and boundaries within the research and revisits the research questions. The research adopted a largely qualitative approach based on a case study methodology, with mixed methods (quantitative and qualitative) from formal project evaluation used within analysis of some cases. The basis for selection of cases is explored later in this chapter. This was critical to identifying representative examples of reuse facilitation that could help identify tentative answers to the research questions, collectively informing understanding of sector-level activity through cross-case comparison. Finally, this chapter briefly introduces the cases, which are explored in more detail in Chapters 5 and 6.

Analysis of research literature and comparison of the theoretical representations of reuse presented in Chapter 3 identified a wide variety of assumptions about reuse facilitation, and highlighted problems in identifying how, and whether, these would prove effective in practice. While resource reuse could occur immediately after resource creation, this would be unusual as the origination of the resource, or the initial sharing of this, is a separate activity to the use. As Section 1.6 noted, there is a lifecycle to reuse which can involve different participants. Thus it was important to study cases over a time period during which some test of the aspiration to create or share resources could occur. At the start of the research period, discussion around learning objects in the UK, as elsewhere at this time, concentrated on the technical aspects of creating, describing, storing and exchanging them, or theoretical definitional arguments about what the term 'learning object' meant. There were few examples of learning or teaching practice where learning objects were used and so little appreciation of *how* they could be used/re-used, *whether* they would be used/re-used and *who* would use/re-use them. Research from that period suggested substantial difficulties in practice in doing so (Christiansen and Anderson, 2004).

Central to this research was the *intentionality* of the activity investigated, what was expected to occur or expected to arise from the facilitation of reuse, and what reuse occurred, or what other activity resulted. As previously noted, the identity of the (re)users and the nature of the (re)use is uncertain in advance of use. Although intended users/uses are usually identified for projects, these aspirations can shift, particularly as a project moves into service mode. For example, CS3-LORO originated as a venture for sharing of optional user-generated resources between part-time Language tutors within the OU. It later acquired an additional purpose, to allow central OU course teams to distribute core resources for teaching. LORO ultimately offered the potential to share OER using creative commons licenses and became partly open access.

Anticipation of reuse and planning for reuse are insufficient to ensure that sustainable reuse occurs. Identifying reuse is further complicated as reuse is a dual aspect activity, comprising both *supplying* and *using*. Although often described as a single integrated activity, these two aspects of reuse can exist as separate activities with different participants (Section 1.6). The timescales, locations and prompts for these two aspects of reuse can vary widely, e.g. transnationally or locally, synchronously or asynchronously, proactively or reactively.

The activity of *using*, in particular, is subject to uncertainty. The more open the conditions, the more challenges exist to identifying predictable 'end-uses' or 'end-users' for reusable learning resources, and to deriving use from measures such as access. As noted in earlier chapters, reuse has a phenomenological dimension, since those encouraging reuse (suppliers of resources or services) and those reusing (users of resources) may view the same activity as fulfilling different purposes and hold different views of the desirable outcomes. For example, the perspective of the educational technologist supporting automated reuse of specifically structured resources is likely to differ from that of the educator. The educator 'end-user' may

be indifferent to, or ignorant about, the technical processes intended to support sharing.

Different perspectives on the importance of accurate metadata, offers an example where differing views about accuracy can impede reuse (Currier, *et al.*, 2004).

The main research question addressed in this thesis was: What makes a digital learning resource reusable and what impedes or encourages reuse? The intended focus for addressing this initially centred on reusable learning objects (RLOs), then broadened to include other types of learning resource. As the research took place over seven years, it was possible to track the effect of engagement with RLOs during their height of popularity, during the decline in enthusiasm for this approach, and also note the growth in interest in an alternative approach, open content or open educational resources (OERs).

Although Chapter 3 offered an overview of the technical and community support that developed from the commitment to develop RLOs, it was not the purpose of this thesis to consider whether particular RLO (or other resource generation) approaches were appropriate or effective at a *technical* level. For example, the significance of resource file type selection for resource digitization and curation, technical operation of content packaging tools, or developments in learning design players, have not been evaluated beyond noting investment in and availability of these. Investigation of how well specific technical supports to reuse worked, comprises a significant distinct area of research. This thesis is concerned with whether reuse was facilitated and explaining why (or why not) and which approaches were adopted, while recognising that technical barriers such as technological incompatibility could present absolute barriers to reuse. If users cannot access a resource to see what it looks like, or import/run it within their online teaching environment, the quality and appropriateness of the resource design or content becomes irrelevant to reuse. The technical reasons underpinning that incompatibility are a separate research topic.

Reuse facilitation in six different contexts is explored through the cases presented and analysed in Chapters 5-7. The reason for adopting a case-based approach is described in this chapter (Section 4.5). The rationale for selecting specific cases is also presented (Section 4.6), together with information about the research methods adopted within the cases (Section 4.8).

The main purpose of this chapter is to explain the choices made in defining the research area, methods and questions, and to consider the methodological approach within this thesis.

Chapter 7 offers a classification of reuse factors that was informed by the case studies and cross-case analysis and identifies two 'modifiers' which also cross the cases.

4.2 Preparation and reviewing the literature

Research commenced with a review of the research literature, both national and international. During 2002, preliminary review of research on learning objects and reuse, and early engagement in creating RLOs for a course, H806 (Case Study 1), provided the basis for a wider review of literature from 2003 onwards. Initial identification and analysis of macroenvironmental and mesoenvironmental factors occurred in late 2004, leading to selection of five initial research questions. The questions (Section 1.5) and the literature were revisited periodically.

Review of the published research literature was supplemented by attendance, physically and virtually, at conferences, symposia, workshops and seminars connected with reuse. Active engagement with blogs, wikis and mailing lists, in addition to familiarity with formal research literature, was important in relating the case activity to parallel mesoenvironmental activity. This helped to determine the typicality and relevance of the concerns and activity identified. It has been a feature of the 'openness' of this research area, and the research period, that many new routes to informal publication have emerged, facilitating online exchanges between

researchers. For example, Kraan (2003) references a key exchange on repurposing of resources which occurred between Stephen Downes and members of the CETIS mailing list. David Wiley's PhD thesis (2000a) and an online version of his edited book on reuse (Wiley, 2000b) following from this, were made available online as open access. A further key text (Littlejohn, 2003) was subject to open review in the online Journal of Interactive Multimedia in Education following its publication (JIME, 2003), with expert commentary on each chapter made available, again as open access. Each of these examples provided an important resource for the literature review, although presented in unconventional form.

Blogs, used by very few researchers at the start of the period have increased in importance as tertiary sources. They support a new form of individual or group reflection which is relevant to the research area and has fostered discussion around key claims. The challenge for researchers in educational technology has, increasingly, become one of identifying within a mass of online resources the key conversations to follow.

4.3 Determining the boundaries of the research

Decisions on what was to be researched and where the boundaries would be set were made in parallel with establishing the research questions. The wider consideration of reuse as a topic of research, informed by the literature review, suggested the specific boundaries adopted and the reasoning is summarised below. The choice of research models was informed by these decisions on the scope of the research and the questions to be addressed.

4.3.1 Why a longitudinal study, and why 2003-2010?

Sufficient time was required within the research period to allow progress from supply (or creation) to use, or for a project proposal to a service implementation. It was hoped that in

researching across an extensive time period sufficient time would be allowed to reach adoption and early maturity in new forms of reuse practice, and reuse facilitation.

Prior to 2002 learning objects and the reuse of online learning resources had principally been pioneered in practice outside the UK (e.g. in Canada where Downes, Anderson, and McGreal were located), and in sectors other than HE (e.g. in the US military). There was little evidence of this as a practice-based approach to resource reuse within UK HE, although the researcher was aware of an early small scale Open Source Teaching Project (OSTP), which suggested the start of OER thinking at the OU and involving other UK HEIs as partners in sharing and reusing educational objects (Naughton, *et al.*, 2001, Hirst, 2001).

The emphasis placed on the time period (2003-2010) was driven by the occurrence of significant interconnected projects within UK HE. The start point of April 2003 marked the launch of the first UKeU pilot course created as reusable learning objects (CS1-H806). This was expected to lead to further examples created for the UKeU platform by other HEIs and potentially reused across the sector. By the close of the research period, and particularly during 2009/2010, the accelerated OER supply activity in UK HE addressed many of the problems that had previously restricted reuse, notably IPR barriers (Section 3.10). This new phase suggested a logical end-point to the research period, as emphasis shifted to address new types of use, often with non-formal and informal learners beyond the UK. This contrasted with the emphasis within RLO activity on reuse by educators in HE, or use by formally registered UK-based students.

The specific end-point of April 2010 marked the close of the JISC/HEA UKOER first phase of activity (www.jisc.ac.uk/oer). This had emphasised sharing *existing* learning resources as OER rather than creating new content, resulting in the deposit of over 10,000 hours of OER into the

JorumOpen repository. This approach of reformatting and applying open licenses to existing resources, contrasts with the emphasis in 2003 on creating a new type of resource (the RLO) from scratch. In the earlier cases the resources shared online were closer to those with Category 1 learning object definitions (Figure 3.1). The resources deposited into JorumOpen were notably more diverse, and had often already been used in teaching practice in offline form. These were closer to Category 2 learning resources (Figure 3.1).

4.3.2 Why focus on UK experiences?

The researcher was aware of research activity in other countries, however this was framed with significantly different emphases. For example, the Natural Sciences and Engineering Research Council of Canada (NSERC), in 2003 granted \$7.5 million for a 5 year, cross-Canadian research project LORNET which was described as ‘A network of expertise grouping over one hundred researchers, research associates and professionals, and graduate students’, (LORNET, undated). Attendance at the 2006 LORNET conference formed part of the intelligence gathering for this thesis. This helped clarify understanding of US and Canadian research approaches to RLOs, compared to UK-focused research priorities. LORNET’s researchers reported within six research themes: Interoperability/Metadata, Design/Aggregation, Adaptive Objects, Knowledge Extraction, Advanced Multimedia Learning Objects and Integration. The ‘Integration’ theme focused on a specific technical integration with TELOS (the Canadian Telelearning Operating System). As this list suggests, these were technically-focused approaches, focused on the technologies to support reuse, e.g. content packaging, metadata harvesting and data mining.

This technical emphasis, underpinned by quantitative rather than qualitative research approaches, has been typical of other US/Canadian RLO research and did not relate directly to

the UK HE environment where repurposing rather than reuse has become accepted as the dominant reuse approach (Section 3.6).

Although this thesis drew on research literature, projects and examples from beyond the UK, and uses a case study based on Irish HE, these have been selected for their relevance to UK HE. Focus on the UK also reflected the educational practice environment in which the researcher operated and had best access to projects suitable for research.

By the close of the research period (2010) the openness emphasised through OER and the trends towards online learning and teaching had eroded many of the technical-geographical barriers to sharing resources. As suggested in Section 7.3.2, while proximity between resource sharer and resource user appear to have remained a significant modifier, by 2010 proximity was less likely to refer to geographical juxtaposition.

4.3.3 Focus on Higher Education (HE) and not Further Education (FE)

Some UK HEIs have a history of working closely with further education (FE), and some FE providers serve HE students. However, although CS3-L20 spanned both FE and HE, the emphasis in this research has been on understanding practice in HE rather than FE.

FE-facing resource reuse initiatives such as the National Learning Network (NLN), initially hosted by the British Educational Communications and Technologies Agency (Becta), were considered within the review at the start of the research. The decision to exclude these and focus on HE was informed by identification of significant differences between sectors. These are stated here as they emphasise the distinctness of reuse in UK HE:

- Several very large projects were influential across HE over this period and were targeted specifically at HE (e.g. the RLO-CETL, the UKeU and the JISC/HEA UKOER

programme). From 2004-2011 the JISC, having previously funded FE-led projects, was required to focus funding primarily on HE projects. This had an impact on the number of formal reuse projects based in FE and available for study.

- Teaching is more dominant in the workload of FE lecturers and the link between remuneration, promotion and teaching proficiency is clearer. For example, it is a requirement that *all* new FE teachers obtain accreditation of teaching skill as part of their induction, but only *some* HE lecturers do this.
- HE teaching staff are required to balance teaching with research activity (as noted in Section 2.6). This is a potentially significant cultural difference, since academic research places emphasis on originality and creation in research outputs, rather than reuse or repurposing. This may influence what academics in HE perceive as desirable conduct within teaching, as well as research. In FE the emphasis is on teaching.
- The operational structures within FE and HE are significantly different, with FE teachers less likely to have ‘tenure’. In 2002 the majority of FE staff (65%, or between 25-30% of full-time equivalent staff) were employed on part-time, often temporary contracts (Foster, 2005). This can reasonably be assumed to affect the amount of time FE teachers have to create new course content ‘from scratch’, and also their interest in planning for reuse of their teaching content while not on secure teaching contracts.
- Many FE courses, for example those with external accreditation, or external exam boards, will have a national curriculum. This makes sharing of common content across institutions potentially easier and more effective than within HE. In universities, individual academics and departments have more control over curriculum design and the range of resources used can be much more diverse. This can restrict the opportunities to discover appropriate reusable resources and affects ease of discovery.

Staff motivation and support to reuse resources in FE was therefore thought likely to differ substantially from that in HE, mainly because the circumstances of teaching were so different. Extending the research scope to consider FE examples was thought unlikely to be informative about the pattern of reuse in the university sector.

4.3.4 Why *learning* resources rather than *research* resources?

Resources reused in teaching and learning may include resources created as research outputs. Some researchers have suggested that reusable learning objects can be any resources which are used for learning, and not restricted to only those made for learning. Category 2 definitions of learning objects (Figure 3.1) can include research resources which are online and digital, e.g. journal articles. This thesis therefore includes research resources where used in teaching and learning activity. It also notes that, during the research period, initiatives in open access publishing and open data introduced many HE staff to technologies applicable to sharing and reuse of educational resources (e.g. RSS feeds, open online repositories, etc.) through *research* rather than teaching activity.

However, sharing and reuse of research output, is otherwise outside the scope of this research and treated as a separate and distinct form of sharing and reuse. Facilitation of reuse of *research* outputs is distinctively different from that of *learning* resources in three ways: clear reward mechanisms to foster the supply of sharable research resources; differences in the 'publication' process; and the type of reuse that research outputs permit.

In UK HE, research is often the main criterion for academic promotion, with citation of research (i.e. evidence of wide reuse of the research) considered an important indicator of research excellence. Within the research period, the Research Assessment Exercise (RAE) 2008 ranked research across all UK HEIs using citations as a key measure of excellence. RAE rankings

have a direct financial impact on UK HEIs by influencing their centrally-allocated research income, as well as flagging up research 'excellence' within and beyond the academic community. Activity to improve citation (reuse) of research outputs is well established in UK HE and attracts rewards at both individual and institutional level. While Leeds Metropolitan University has initiated a scheme to recognise OER activity as an academic performance objective (Thomson, 2010) that is an approach not yet widely implemented.

In addition to established incentives for sharing research, there are also established routes to facilitate dissemination. Journal and book publishers assist in marketing, to attract use, as well as managing the production and distribution. While textbooks (i.e. teaching-focused books) are also published, very few educators will engage with publishing in this sphere, whilst many academics will use publishers to disseminate research.

Finally, the use that is made of research outputs is different. As Section 3.6 noted, reuse of teaching resources often leads to repurposing. This freedom to repurpose the resource through modifying the content, and the need to do so, does not exist with research outputs. There the creator and publisher maintain a high degree of control over the form of the resource, which may be referenced and quoted (as forms of reuse), but cannot be easily be versioned, re-issued or shared. This restriction applies even where research outputs are used as teaching resources. Although open data may offer opportunities to reuse some research outputs, this is not a widespread practice.

It is a reasonable assumption that the practices familiar to academics in research: expectation of reward linked to dissemination; high level of support to publish and market work; and control over the form in which the output can be used, influence expectations of how reuse of teaching resources should occur. This assumption was not explicitly tested in this research, although factors identified in the cases (Chapters 5-6) indicated that all three are considered

desirable or necessary pre-conditions of sharing learning resources by at least some practitioners.

4.3.5 Why ‘learning objects’ and what does this mean in this study?

The analysis in Chapter 3, traced how the terms ‘learning object’ and ‘reuse’ have been defined and have evolved. The term ‘learning object’ in the Category 1 sense (Figure 3.1) suggests supply and reuse of learning resources which are significantly different and intended for a different approach than the established reuse practice noted in Chapter 1. In the Category 2 sense, a ‘learning object’ is a resource which is online and digital. Although less restrictive as a definition, this again suggests a new style of reuse activity. Online learning and blended elearning were, during this period, relatively new approaches to learning and teaching in UK HE.

As outlined in Chapter 3, the RLO approach was developed as a way of overcoming known constraints on reusability (e.g. problems of interoperability or inappropriate granularity). Although directed at a model of widespread automated reuse of RLOs which did not occur, implementing RLO principles in resource design could also assist with reuse in standard learning and teaching. By April 2003 opportunities for unproblematic reuse of CS1-H806 RLOs were already being progressed. Wider RLO collections offered examples of resources which were reusable in principle and *should* be reusable in practice.

Since RLOs addressed problems in reuse of resources, a focus on these provided an opportunity to test how well existing models of reuse were understood. If RLOs were not being reused, that would suggest additional unidentified barriers, or ineffectiveness in the enablers, relating to sharing and use of RLOs. This would indicate that understanding of the nature of

the problem, what was required to achieve reuse of learning resources in UK HE, was incorrect leading to implementation of an inappropriate ‘solution’.

4.4 Research questions

The review of existing research and activity (Section 4.2) informed identification of research questions relevant to the research area described in Section 4.3. Initially, as noted in Chapter 1, five research questions were considered. These were reduced to the three:

1. *What facilitates reuse of learning objects in the later stages of the learning object lifecycle?*
2. *What models of reuse of learning objects are being explored and currently in operation in UK universities?*
3. *What potential advantages other than reusing content does sharing of learning resources, such as learning objects [as defined in 1 above], afford within UK higher education.*

The two excluded questions were:

4. *To what extent can, and are, learning objects useful in transmitting pedagogical expertise, particularly in terms of supporting new academic staff or those who are new to e-learning?*
5. *What resistance might there be to using content management systems (CMS), virtual learning environments (VLE) or Knowledge Management systems to exchange practice as well as resources?*

These additional questions were informed by the early positive experiences of reuse within CS1-H806 . They refer to sharing practice intra-or inter-institutionally, for example reusing learning objects as staff development, as occurred for reuse of H806 RLOs for the Hot Topics series (Pegler, 2004). Question 5 noted the potential for CMS/VLE systems, increasingly adopted in UK HE, to share examples of e-learning practice as well as to meet the demand for digital resources for these new online teaching and learning systems. Lamberson and Lamb (2003) had pointed to the potential of these local institutional repositories to support sharing of practice alongside sharing of resources. They also identified problems:

The amount of intellectual capital that is resident in CMS sites worldwide is staggering. Associated with this reservoir of content is an even deeper, more important, largely underappreciated, well of faculty pedagogical expertise. With their large user bases, there is tremendous potential for the CMS to form a basis for exchanging content and best practices. However, while more and more faculty and programs have come to rely upon course management systems over the past few years, rapid technology and business changes (mergers, elimination of products, etc.) have brought about a sense of discomfort in the community.' (Lamberson and Lamb, 2003, p59)

Writing from the perspective of educational technologists, Lamb and Lamberson noted a 'sense of discomfort' resulting from the rapid changes in technology, identifying the challenge of expecting the broader teaching community to engage with technical systems which may be removed or replaced by others. This reflects and recognises the technical turbulence of the time. Since 2010 the work of Conole and others (e.g. OPAL, 2010) has emphasised the potential arising from sharing 'open practice'. Like IMS Learning Design (associated with exchange of RLO) open practice, linked to sharing of OER, seeks to support migration of activity

across different technical systems. It is the most recent attempt to utilise what Lamberson and Lamb described as a 'largely underappreciated, well of faculty pedagogical expertise' (p59).

Questions 4 and 5 were set aside during 2004, in favour of the other three, for two reasons.

First, they placed emphasis on learning design rather than learning resource reuse, and these two were no longer so closely associated, broadening the research scope unacceptably.

Second, the pace of change in wider practice, was perceived as too slow to address these questions within the research period. For example, existing VLE implementations were new, unfamiliar to many staff, and most were too inflexible to support this type of sharing (e.g. centred on formal classes rather than informal communities).

Expectations of a compulsory scheme to accredit HE teaching staff had also stalled, so there remained no clear route in many HEIs to re-skilling staff to use emerging technologies.

Although, by 2010, many institutions required new teaching staff to complete a Postgraduate Certificate in Academic Practice (or equivalent) accredited by the Higher Education Academy (HEA), unlike FE this was not universal practice. Questions 4 and 5 remain relevant although outside the scope of this thesis. Sector-wide activity directed at addressing these started in the UK during 2010/11 within the Open Materials for Accredited Courses (OMAC) programme, an initiative to share resources and through these improve teaching practice. This programme has been led by the HEA as part of the Phase 2 UKOER programme (JISC, 2010). How to re-skill more experienced teaching staff has not yet been addressed, but many will now use technologies relevant to online digital resource reuse for research, even if not for teaching, suggesting transferrable technical skills.

The form of Questions 1-3 was reviewed periodically during the research period and amended as necessary. For example, the question on models (Question 2) was broadened to include

business models, having been originally expressed as, ‘What models of reuse of learning objects (in terms of relative degrees of automation) are being explored and currently in operation in UK universities?’ The original wording became less appropriate when the anticipated widespread availability of learning objects within the UKeU platform did not materialise and engagement with the conventional automated model of RLOs failed to emerge. The waning of enthusiasm for automation became particularly evident in UK HE, where repurposing rather than reuse was favoured in practice (Section 3.6).

4.5 Choosing a research approach

A range of research techniques, both quantitative (including online survey) and qualitative, (including online Delphi), were considered in addition to the case approach which was ultimately selected. While the answers to research question 2 (RQ2), and some aspects of research question 1 (RQ1) appeared to be answerable through quantitative approaches, the turbulence and uncertainty within resource reuse, and the wide range of facilitative approaches adopted suggested a more inductive approach. In answering the questions the objective was not only to record what was occurring within UK HE with regard to resource reuse, and address what impact specific technical formats and measures, e.g. RLO use, had, but also to build theory from this which could be applied more generally, to inform future activity. A primarily qualitative approach, consistent with an interpretivist research paradigm was therefore chosen, rather than a positivist approach which would assume a single testable hypothesis, or limited set of testable hypotheses, about reuse. Further discussion of research paradigms occurs in Section 4.5.3.

4.5.1 The limitations of quantitative research of reuse

There are limits to the effectiveness of quantitative measures in understanding *why* a phenomenon occurs, and this was the underlying emphasis of the three research questions (Section 4.4). There were also specific limits to using quantitative measures within this specific research area to determine *what* reuse was happening. Although sophisticated data mining, or user-tracking approaches appear to offer insight into which resources were viewed and whether these were downloaded and uploaded as different versions elsewhere, these measures are reliable only for technically-mediated resource reuse, so offer only a partial view of reuse activity.

Even where reuse metrics are available, these quantitative measures may mislead if considered in isolation. As previously noted, the number of downloads of a resource is a poor indicator of how or whether this resource will be used in practice (Davies, 2004). It also applies a restrictive measure of reuse. Where reuse occurs it may not be traceable through online systems, for example if information from a webpage is copied and pasted into a handout, or where direct links are provided to students. As access to reusable online digital learning resources became progressively more open, reflecting engagement with OER, registration is less commonly required in order to access resources, restricting the opportunity to track user activity. In 2009, OpenLearn estimated that less than 3% of the overall users traced through tracking software on its site were registered users (McAndrew, *et al.*, 2009, p.21). So, although some users and use might be identified quantitatively, this may be atypical and is likely to exclude some types of reuse, as well as some types of user.

As reuse does not depend on the original resource remaining available online, reuse can occur after a reuse project ends. Although a longitudinal approach was adopted some reuse was likely to be excluded as occurring 'out of period'. Furthermore the length of time taken to

observe reuse was longer than anticipated from CS1-H806 practice. During 2003-2010 most activity remained focused on reuse facilitation (i.e. early reuse lifecycle activity in expectation of reuse, or directed at creating reuse) rather than active later lifecycle reuse.

The research was also concerned that external drivers such as the source of funding, created opportunities for engagement with reuse which, in terms of quantitative data, could be particularly inauthentic and unrepresentative of practice. The form and volume of supply and use could be distorted. For example, at the start of the period the UKeU *required* courses developed for its platform to be created as RLOs. There was no practice-led requirement within the pilot courses (e.g. CS1-H806), or their institutions, to take this approach. Similarly, JISC set targets for the amount content (specified in student activity hours) that the 29 projects funded during the UKOER Programme Phase 1 should release. JISC also suggested the type of license to adopt (Creative Commons), and required deposit into a specific location (JorumOpen). External drivers influenced the volume and format of reuse and repurposing activity throughout the research period. As project activity offered one of the main sources of research data, the researcher was concerned that project drivers obscured interpretation of purely quantitative measures in understanding how reuse might be facilitated, or have occurred, under more authentic conditions.

4.5.2 Qualitative and case-based emphasis

This research took a primarily qualitative approach, employing the four major methods associated with quantitative research: observation; analysing texts and documents; interviews; and recording and transcribing (Silverman, 2004, p11). Whilst some limited use of quantitative research techniques, primarily survey analysis was used, this occurred *within* the case studies, at the case level rather than *across* cases, or at the population level. This limited use of mixed methods focused attention on the context in which this data was gathered. Given the level of

disagreement around use of terms such as 'learning object' (Section 3.3), and 'reuse' (Section 3.6) additional qualitative information was required to interpret quantitative data.

The CURVE project (Section 3.4) showed the range of activities associated with reuse and the different purposes these served. This suggested that using as part of reuse was a very context-specific activity, requiring a research approach which could identify the variety of meanings and values placed on reuse by different participants.

Qualitative rather than quantitative methodologies is associated with developing understanding of this interplay between phenomenon and context. A mixed research approach within a primarily qualitative, case-based, research methodology was adopted. Within this an emphasis was placed on interviews (23 recorded interviews), but these were supplemented by real-time data capture observation, focus group discussion, document review and small-scale, inter-case, surveys.

The research questions required identification of the behaviour of participants in reuse and some interpretation of their motivation, within a research area where there was no common agreement on the reuse approach to adopt. The sudden demise of the UKeU during 2004, added to confusion amid questioning of its achievements (e.g. Computing, 26 May 2004), leading to a House of Commons inquiry (House of Commons, 2005). The UKeU work in championing RLOs was suspended, and the developer community formed around this was disbanded. Although equivalent activity later emerged through the RLO-CETL, this promoted a more directive approach to RLO generation, emphasising use of multimedia templates. This additional UK-specific turbulence around RLO activity added to the uncertainty in predicting where reuse would occur. A number of alternative qualitative approaches were considered which were suited to the emergent nature of the activity to be researched. These

included ethnographic educational research (Hammersley and Atkinson, 1995, Taylor, 2001) and action research approaches (Robson, 2003, Blaxter, et al., 2001).

Although there were some similarities between different examples of reuse facilitation, and often connections between reuse projects available to the researcher, there were also fundamental differences which suggested that there would be a low level of generalisability from a single context to others. The potential to derive a detailed insiders' perspective through ethnographic study was attractive given the uncertainty about the internal processes and decision making around reuse. However broader uncertainty around timescales for reuse and the inauthenticity and other features of some project activity (Section 2.5.5) created barriers to identifying appropriate and representative ethnographic research contexts. This research approach would, through the work of a single researcher, offer a necessarily restricted perspective on what had emerged as broad sector-wide research questions. This approach would lead to research of limited relevance to understanding reuse across the sector during a period of considerable uncertainty and change. A principally ethnographic approach was therefore not selected for this research.

Action research has been linked with of improving practice through research and has a distinctive 'teachers-as-researchers' approach (Carr and Kemmis, 1986, p18-19). This was appropriate to the emergent research-informed reuse activity within UK HE during 2003, in particular the use of RLOs by UKeU pilot courses. Creators of resources for these already had a close connection and were operating as a distinct community of practice, suited to exploration using action research. These pilots represented long-term authentic engagement with practice (RLO creation/reuse) in a context where participants were motivated to actively apply and iteratively refine new approaches in a practice area of considerable uncertainty.

Although action research methodology was not adopted, the iterative nature of the action research spiral model (Atweh, *et al.*, 1998) informed the approach to the selection of cases. This spiral suggested that learning from the initial stages of the research could be carried through into later stages of the research *across* the case contexts, as it is *within* an action research context. Iteration between stages of research occurred, with earlier case research informing selection of later cases. Dissemination of practice related to CS1-H806 (e.g. Weller, *et al.*, 2003b, Weller, *et al.*, 2005 and Mason, *et al.*, 2005), within which the researcher was a participant teacher-researcher, formed the basis for obtaining access to, and the approach taken with, later cases.

Patterns of reuse activity and facilitation varied across the research period in terms of: the approach taken (e.g. Category 1 or Category 2 type learning resources); where within the sector this activity occurred (e.g. repository-based provision, or direct contributions from individual practitioners); and the scope of the activity (e.g. national, disciplinary or institutional). As the objective of the research was to understand sector-level opportunities and activities a holistic view of reuse activity/facilitation was required and this diversity presented a particular research challenge. Opportunities to research reuse included contexts which represented project activity over short time spans and those related to on-going service or long-term institutional initiatives. The research needed to occur in real-time, in order to address authentic reuse interventions occurring in practice, a requirement which could be met through case analysis. As noted above, the highly contextualised and sometimes experimental nature of reuse initiatives encouraged comparison of a spread of examples, rather than a single example, to support triangulation and improve generalisability of any conclusions. A multiple-case approach, with selection of cases to reflect the spectrum of sector-relevant reuse activity was adopted to facilitate cross-case comparison.

Yin (2003) identified the specific strength of case studies in focusing research on contemporary events when there is no manipulation of the behaviour, but potential for direct observation and interviews. He set out this definition of scope: 'A case study is an empirical enquiry that: Investigates a contemporary phenomenon within its real-life context, especially; when the boundaries between phenomenon and context are not clearly evident' (p5).

Gerring (2007) addressed the particularity of a single case: 'a spatially delimited phenomenon (a unit) observed at a single point in time or over some period of time. It comprises the type of phenomenon that an inference attempts to explain' (p20). He compared the different research goals of single- and cross-case studies, as illustrated in abbreviated form as Figure 4.1.

Figure 4.1: Case Study and Cross-Case research goals

Research goals	Affinity	
	Case study	Cross-case study
Hypothesis	Generating	Testing
Validity	Internal	External
Causal insight	Mechanisms	Effects
Scope of proposition	Deep	Broad

Source: based on Gerring (2007, p38, Table 3.1)

Stake (2006), writing specifically about multiple case study analysis, pointed out that cases used for cross case comparison, may be programmatically linked, or can be examples of an

issue, or phenomenon, without such a link. In this research the individual cases did not have a consistent 'programmatic link', although they all occurred within the common macro- and mesoenvironment outlined in Chapters 2 and 3. Stake stresses that, while each case has its own story to tell, the rationale for a multi-case approach is to better understand the whole phenomenon. He uses the term *quintain* to describe the research target at which the cross-case analysis is directed:

Multi-case research starts with the quintain. To understand it better, we study some of its single cases – its site or manifestations. But it is the quintain we seek to understand. We study what is similar and different about the cases in order to understand the quintain better' (Stake, 2006, p6)

In this thesis the individual cases and the stories arising from their contexts are presented in Chapters 5-6, while the cross-case analysis occurs in Chapter 7. Chapter 8, the Conclusion, relates the analysis and case studies to the research questions and the research to wider reuse activity.

Following Yin's advice (Yin, 2003, p14) the research used multiple sources of evidence, triangulated using comparators derived from critical review of research and wider literature. The six cases centred on activity directed at facilitating reuse of online learning resources. The cases studies were developed to establish context, scope and practice, informing understanding of a spectrum of approaches to reuse across the time period. There was some iteration between cases, borrowing from the action research spiral, with observations from earlier cases shared with participants in later cases through the researcher's role as critical friend, steering group member or evaluator.

It is a feature of the research area that there is a close connection between the phenomena researched (facilitation of reuse, models of reuse and emergent advantages of reusable learning objects other than reuse) and the contexts in which these occur. Online reusable resource sharing and use was innovative and exploratory activity, about which little was known or predictable. The variety of approaches represented by the cases is indicative of sector uncertainty around how to achieve or support reuse. Reuse was itself also part of a wider spectrum of activity supporting changes in teaching practice within UK HE.

Cross-case analysis allowed comparison of reuse across different contexts, employing different models and within different timeframes. Multiple case studies allowed representation of a range of reuse facilitation approaches, with a high degree of independence between these. That independence allowed the researcher to respond to opportunities for data collection or case selection which could not have been anticipated at the start. Selecting a flexible, qualitative, cross-case approach recognised the high level of uncertainty around resource reuse activity apparent throughout research period.

4.5.3 Research paradigms and paradigm diversity

Resource reuse activity is hard to anticipate, as the exploratory case (CS1-H806) illustrated. It may also be slow to emerge, which was not evident from that same case. The unpredictability of reuse and the need to observe this in a naturalistic way, with emphasis on understanding context as well as phenomenon through qualitative research locates the research within an interpretivist (or constructivist) research paradigm (Denzin and Lincoln, 1994) rather than a positivist one. As previously noted, the limitations of quantitative metrics and measures, and the problems of creating authentic tests, presented additional practical obstacles to adopting a positivist experimental approach. Although action research, a method associated with the critical research paradigm (Creswell, 2003), was considered and some aspects of participative

action research occurred within the initial exploratory case (CS1-H806), formal cycles of action and reflection with other participants did not occur.

Although the term paradigm, based on its natural science origins (Kuhn, 1970), suggests that paradigms succeed each other, social science research paradigms can co-exist, offering the researcher the opportunity of choosing between them as occurred here. Writing about Information Systems, a discipline area which has similarity in scope and origins to online learning, Mingers (2001) has argued for research which incorporates more than one paradigm. He described this as 'strong plurality' (p243), suggesting benefits to: *triangulation*, when validating data and results through combination of data sources; *creativity*, in discovering new or 'paradoxical' factors to stimulate further research; and *expansion*, taking account of the wider situation (p244). He describes the desirability of paradigm diversity thus:

a research study is not usually a single, discrete event but a process that typically proceeds through a number of phases. These phases pose different tasks and problems for the researcher. However, research methods tend to be more useful in relation to some phases than others, so the prospect of combining them has immediate appeal. Even where methods do perform similar functions, combining a range of approaches may well yield a better result. (Mingers, 2001, pp243-4)

This emphasis in adopting plural paradigms is appropriate to the successive stages of this longitudinal, sector-wide research. Through adoption of approaches informed by an interpretive research paradigm, the researcher explored the complexity and confusion around resource reuse across many different contexts. While throughout committed to a naturalistic, context-rich, rather than positivist experimental approach, the researcher's approach, shifted from an initial engagement with the critical theory paradigm (i.e. activity research methodology), towards one based largely on the interpretivist paradigm.

This shift reflected turbulence around the concept of learning objects, arising in part in response to mesoenvironmental shifts, for example the ‘Three objections to learning objects’ leveled by Friesen (2004). It also reflected awareness following CS1-H806 that context played a major role in reuse outcomes. What had originally appeared to be a theory (RLO reuse) which was relatively stable and suited to further exploration through action research was recognized as less suitable for understanding resource reuse during this period. Instead the researcher aimed to explore reuse approaches across diverse, sometimes unrelated contexts. Case study analysis is an approach which, combined with a grounded approach to case selection and analysis, has been argued can attain ‘an understandable and sincere account of the phenomenon’ (Andrade, 2009). This satisfied the researcher’s objectives and addressed the research questions.

4.6 Introducing the six cases

Chapters 5-6 provides analysis of each of the cases, however to introduce discussion about their selection, brief background information on each is provided here.

Case Study 1: H806 (Learning in the Connected Economy) April 2002 – December 2008

H806 was an OU course (module) commissioned by the UKeU and constructed from learning objects. The researcher was a co-creator of the course and during 2003/4 observed and initiated reuse of learning objects from H806. The resources were created specifically for the course (Category 1 type learning resources) and were mainly text-based.

Case Study 2: Stòr Cùram, October 2003 – July 2005

The Stòr Cùram project created a national discipline-specific repository for use across nine Scottish HEIs. The repository was to be formal, supported by a metadata librarian. This project addressed challenges to sharing and reuse identified in previous Scottish repository projects

(e.g. Littlejohn, 2003). The resources were mainly multimedia, created or repurposed specifically for the new repository service.

Case Study 3: L₂O, January 2005 – July 2006 and LORO April 2009 – June 2010

These two projects were separate but linked, showing transfer of learning and tools across institutions (from Southampton to the OU), from a project near the start of the research period to one near the end. They also illustrated shifts of emphasis over the research period within similar types of activity. Both were JISC-funded projects aimed at supporting Language teachers and focused on sharing existing resources rather than making new ones.

Case Study 4: SORRS project/HSC Resource Bank service, September 2004 – January 2008

An institutionally-funded (rather than externally-funded) project to create a departmental repository project within the Department of Health and Social Care at the OU. The repository was to be accessible to students as well as OU central academics and tutors and was developed to integrate with the OU Moodle VLE. Existing resources from OU courses/modules were repurposed for the project and service.

Case Study 5: Personal Repositories Online: Wiki Environments (PROWE), June 2005 – July 2007

PROWE was a JISC-funded project addressing personal and informal sharing of resources for reuse within the part-time distance teaching tutor communities of two institutions (the OU and University of Leicester). Blogs and wikis were used on both sites to support online sharing activity.

Case Study 6: National Digital Learning Repository of Ireland (NDLR) 2004 to date

NDLR was a national project focused on establishing elearning communities of practice and

setting up a national repository to support sharing and reuse across those communities.

Although based in Ireland, and smaller scale than the UK national repository equivalent,

(Jorum), NDLR used the same technical repository system as that service. (The NDLR acronym has more recently been used to mean National Digital Learning Resources).

4.7 Criteria for case selection

This research sought to understand how resource reuse could be facilitated, identifying and comparing the factors relating to reuse across representative but diverse contexts, noting and comparing generalisable themes from specific examples of reuse facilitation and/or experience. One of the theory building outcomes was expected to be identification of factors arising from reuse facilitation, derived from coding comments and observations resulting from qualitative analysis. To ensure generalizability it was necessary to select cases which were individually representative of a range of reuse practices. These needed to collectively reflect the spread of drivers and approaches to resource reuse in UK HE.

The six case studies were linked to projects and initiatives, part of practice-based activity directed at reuse. Figure 4.2 illustrates the scope of activity of each of the cases, based on its initial plan (i.e. the basis for selection). The figure classifies the cases in terms of the form of the initiative (e.g. formal/informal, course/repository), the disciplinary base, and the intended users (e.g. registered students/staff only/specific institutions). The cases were selected to represent UK HE reuse activity in terms of population validity (Sapsford and Jupp, 1996). Each case was part of UK HE activity during the research period (excepting CS6-NDLR which was linked to UK activity).

Figure 4.2: Comparison of cases – type, discipline and audience

	Type	Disciplinarity	Intended users (initial plan)
H806	Course/Module	E-learning (cross-curricular)	H806 students and tutors
Stòr Cùram	Repository project	Social Work education	Social work educators at nine Scottish HEIs
L₂O	Regional support and advice project	Languages	Educators in HE, FE, Sixth Forms (South West only)
LORO	Repository (semi- formal) project	Languages	Part-time tutors within a Department of Languages
SORRS	Repository (formal) project	Health and Social Care (HSC)	HSC students, staff and tutors within institution
PROWE	Blog/Wiki project (informal, personal)	Inter-disciplinary and cross-curricular	Part-time DL tutors at OU + University of Leicester
NDLR	Repository + CoPs	Multi-discipline	Irish HE staff

In addition to the spread of type, discipline and scope criteria, case selection was informed by interest in the research propositions they addressed. These reflected the objectives of the project and the evaluation activity where this was part of the researcher's role. They also reflected opportunities to explore questions raised by previous cases and arising from activity within the wider, evolving, mesoenvironment. For example, one reason for selecting Stòr

Cùram was the opportunity offered to offer comparison with the exploratory case CS1-H806 and compare the activities of in establishing a repository service, with emphasis on formal metadata, would differ.

Chronologically the cases were drawn from across the time period, with some, e.g. CS6-NDLR and CS3-LORO, directly adopting technical systems pioneered by earlier initiatives. Some funded projects of limited duration finished before 2010 (e.g. CS1-H806, CS3-L₂0 and CS5-PROWE). Others were still in progress (e.g. CS3-LORO and CS6-NDLR), or developed into services (e.g. CS4-SORRS and CS2-Stòr). The case selection was also informed by access to data, including interviews with active participants and, where possible, access to learning objects and repositories under development. Access to all repositories was negotiated for at least a limited period.

Figure 4.3: Cases and levels of reuse repository

Reuse/Repository level	Case Study
National (unlimited scope)	NDLR (Ireland)
National (specific scope)	Stòr Cùram (Social Work education focus) (Scotland)
Consortium	L ₂ 0 (Southampton and other South-West region HE/FE institutions)
Regional	
Discipline	LORO (see also Stòr Cùram and L ₂ 0)
Institutional	None

Departmental	SORRS (OU), LORO (OU)
Course/Module	H806 (OU)
Individual	PROWE (OU and University of Leicester)

Where relevant critical incidents within the project are identified, in particular activity or decisions which may have affected reuse outcomes. The researcher acted to some extent as participant-observer within all cases, but in only one case – the reuse at course level (CS1-H806) was she a principal actor herself. Figure 4.4 illustrates the role that the researcher played with relation to each case, in addition to her contact as doctoral researcher.

Figure 4.4: Additional researcher role within cases

	Role of researcher	Contact with project
H806	Co-designer, co-author, co-evaluator	Course production and presentation team member. Participant throughout development and delivery. Access to UKeU platform in development and presentation. Devised/Led two reuse initiatives based on H806 (Section 5.3).
Stòr Cùram	Evaluator of RLO usability and accessibility	Attended steering group meeting at start of project. Access to business case and other project documents. Informal meetings and email contact with project staff including RLO developer. Access to the repository under development and the

		learning objects in development.
L₂O	Initially external evaluator until changes in project removed this role.	Initially contracted as evaluator with attendance at early project advisory group meeting. Access to project proposal and other project documents. Informal meetings with project staff. Later access to the repository under development and the RLOs in development. Invited participant at Contextual Metadata symposium.
LORO	Member of steering group	Attended two steering group meetings. Advisor on evaluation and critical friend with access to reports. Access to repository under development.
SORRS	Member of steering group	Attended steering group meetings during project phase (2004-2008). Access to repository under development (demonstrations only).
PROWE	Member of bidding team and lead evaluator	Attended project group and some steering group meetings. Access to project documents. Access to blogs/wikis at OU and (for accessibility evaluation only) blog/wiki at University of Leicester. Represented project at several JISC events.
NDLR	Critical friend	Invited presenter at two internal conferences. Access to project wiki and workpackage reports. Access to repository. Informal meetings with project staff.

4.8 Data collection and interview process

Multiple data collection strategies were used within the cases. While interviewing was the main research gathering technique, there was also use of: survey questions (CS1-H806 and CS5-PROWE); data capture suite observation (CS2-Stør and Csa 5: PROWE); and focus group meetings (CS5-PROWE). Semi-structured interviews (face-to-face, telephone or within data capture suite) were conducted for all the cases and data output and reports from all the cases (where this was available to the researcher) informed the interviews and is referred to in the cases as relevant. As evaluator of several of the projects, the researcher was the author of some of the reports referred to.

Quantitative data including information on actual and projected use was referred to where available; however the difficulty of predicting use on this basis has already been commented on. Other problems became apparent where deposit of resources was required by an externally-imposed deadline, leading to deposit en bloc at key stages. This created surges in system traffic, including logins, registrations, downloads, uploads and access to Helpdesk. It also led CS1-H806 participants to add metadata for all RLOs within a short time period, leading to sub-optimal metadata generation. Compromises similar to these were also considered likely in other cases. Atypical peaks in reuse activity could also occur linked to episodes of staff development activity (e.g. during hands-on workshops).

Qualitative and quantitative data generated by project evaluations was available to the researcher and drawn on, with other internal documentation when conducting semi-structured interviews with key project personnel as separate research activity. The interview/observations conducted for each case are shown in Figure 4.5.

Figure 4.5: Interviews and observations related to case study research

	Data collection	Participants
H806	Survey and telephone interviews of students at end of 2003 and 2004 presentations of course.	H806 students (2003 and 2004 cohorts)
Stòr Cùram	Data capture suite observation of potential user (2) selecting/evaluating Stòr Cùram learning objects	Lecturers
L₂O	Semi-structured telephone interview	Member of project team
LORO	Semi-structured face-to-face interview	Member of project team
SORRS	Semi-structured telephone interviews (4)	Members of project team
PROWE	Focus group meetings (2) with OU tutors. Telephone interviews with OU tutor users (7), UoL staff (4). Face to face group interview (3 UoL staff)	Users (OU) Potential users (UoL)
NDLR	Semi-structured telephone interviews (3)	Members of project team

As comments are reported anonymously in this thesis codes were used to identify individual interviews, e.g. SORRS A, PROWE D etc. Appendix 1 provides a list of the interviewees with brief contextual information on each.

All interviews were recorded except for CS1-H806 student interviews. There notes were taken during telephone interviews by three academics including the researcher and access to these was obtained for analysis. For CS2-Stòr the data capture suite observations were video and audio format, for other interviews audio only was used.

All recordings were transcribed and checked and transcriptions were then coded by the researcher using open coding to identify key reuse factors mentioned by participants. Coding occurred on two separate occasions to discern patterns and anomalies and to support identification of main themes relating to reuse and repurposing activity. Analysis and comparison of the coding provided a grounded approach to analysis within and across cases.

In reviewing the recordings the researcher was conscious that, as Williams (1994) commented:

The data is not 'cold'. It has been collected within a certain interactive context ... and must be analysed with that in mind (p20).

The point at which the data was collected was relevant to its interpretation. In one case (CS3-L₂0) an interviewee was being asked to reflect on the project after 3-4 years had passed. She was encouraged to consider her recollections from this project within the context of intervening projects. All other interviews occurred while the project was still 'live' or within a short time of it ending.

Following the completion of the last interviews in September 2009 earlier interviews and observations were revisited and reviewed. Factors identified from earlier research were compared with the observations recorded and themes derived from the more recent research and more recent developments in mesoenvironmental practice. In this way the earlier data not only informed subsequent research, suggesting additional themes and lines of enquiry, but also contributed to understanding of how attitudes to and expectations about reuse had changed. As this analysis revealed, expectations of what is necessary to facilitate reuse changed significantly over the period 2003-2010, although the central importance of reuse to the future of higher education was maintained (Cooke, 2008).

4.8.1 Interview process

All except four of the formal interviews and observations were conducted by phone. The two observations for CS2-Stòr, were carried out in the Institute of Educational Technology Data Capture Suite (described more fully in Section 4.7.3). The interview with the CS3-LORO project manager (Sept 2009) and the interview with three University of Leicester researchers for CS5-PROWE were conducted face-to-face at the request of the interviewees.

All interviews and observations (apart from those for CS1-H806) were audio recorded with the agreement from participants, using a device which captured both sides of the telephone conversation as a single digital recording. The purpose of the recordings, i.e. as part of PhD research as well as part of any evaluation activity, was made clear to the interviewees at the start of the interview and when arranging the interview. Arrangements were made through face-to-face meetings or through email exchanges. For interviews during 2009, and also for the CS4-PROWE interviews, questions were circulated in advance. Some interviews by mutual agreement deviated from the script.

4.8.2 Semi-structured interview format

For the telephone interviews conducted during 2009 (CS3-L₂0 and LORO, 4: SORRS and CS6-NDLR) a 'generic' set of questions were created and provided to each interviewee in the week preceding the interview. This approach was adopted to cover key factors relevant to each interviewee in a consistent fashion, while also permitting flexibility to explore issues raised by individual experience and to follow up variations in their answers. The interview style adopted was as close as possible to a relaxed conversation between peers.

Providing questions as an email attachment in advance of the interview was intended to demonstrate transparency in demonstrating the proposed scope of the interview. Although

not all interviewees read the questions in advance, some did so. Several prepared for the interview by having documents to hand to which they referred (e.g. project mission statement, slides from a presentation on evaluation).

Interviewees were advised in advance that the interview questions were a guide. They could suggest alternative questions and not all questions might be asked, while additional questions might follow up on points made and not anticipated on the question sheet. Where there was deviation from the scripted questions the interviewer sought assurance that this was acceptable to the interviewee.

The order in which the questions were addressed changed with each interview, reflecting information provided to earlier questions and the amount of time available. The interviewer sought clarification on any points not understood and examples or expansion of points raised were requested where necessary. The aim was to complete interviews within an hour, with a target of 45 minutes. This was possible in some cases, although in others, the discussion became wider ranging and two interviews extended to nearly two hours.

4.8.3 Data capture suite

The Data Capture Suite (DCS), located in IET, is configured to create an audio visual record of human computer interaction suitable for analysis. It is used for both developmental testing and usability trials by IET and external researchers.

For the desktop activity referred to in Case 2: Stòr Cùram and CS5-PROWE, it captured the on-screen activity of single users in separate sessions, creating synchronous audio and video recordings of these for analysis and review. As described in Appendix 2, the researcher was present during the recordings with the potential resource users (STOR A and STOR B) and also

during the recordings of the accessibility expert Dr Colwell for Stòr Cùram, and also for PROWE. Although the activity was scripted with questions identified in advance, participants were prompted for more explanation if required. They were aware that they were being recorded and were given access to transcripts following the sessions.

The researcher had prior experience of designing activity for DCS observation within an earlier project (Morris, 2002). One of the primary reasons for using this approach within the Stòr Cùram and PROWE projects (as described in Pegler and Colwell, 2008), was to create a durable record of the interaction, and in particular demonstration of use of assistive technology, which could be shared with and referred to by off-campus partners involved in the two projects but not based at the OU.

4.9 Ethical considerations

The researcher already had an 'identity' within the reuse and learning objects community from an early stage in the project (e.g. as the practitioner presenter representing pilot projects at first sector-focused UKeU Developers Forum (Cambridge, June 2003)). This reputation in the area being researched was used to establish a trust relationship with relevant 'gatekeepers' within each case group, to obtain interview access. Through her roles in the cases (Figure 4.4) she was given access to project documentation and systems to inform her research. These arrangements were consistent with best practice advice on obtaining research access, e.g. Foster (1996).

The researcher was regarded as, to some extent, an 'insider', understanding the problems of reuse in practice and with assumed sympathy for the difficulties. Hammersley and Atkinson (1995) describe this role within ethnographic research as that of acceptable marginal member of the group. Although this was not ethnographic research this is a helpful term to use. In all

cases the researcher made her position as doctoral researcher transparent. All participants with whom she had contact were aware of her research interest and her doctoral research activity with regard to the case and their own activity within this.

The researcher was in some cases part of the management or steering group activity for the projects, and in one case the creator of resources. In none of the cases was she the main director of activity, although she contributed academic advice or reports to all the cases.

Being part of the research community whose practice was being researched could have posed problems for the researcher, particularly for a longitudinal study of several years duration. It was not possible to 'escape' the world of reuse and learning objects had study in a more detached fashion been required. However active engagement with the cases and the reuse community as both participant and observer, allowed access to otherwise restricted documents and meetings which provided a deeper understanding of the reuse contexts.

In some cases the researcher, because of time constraints, negotiated a less formal role than that originally offered. For example in CS6-NDLR the role of critical friend rather than external evaluator was adopted. This change reduced access to primary sources but led to a more relaxed relationship with the NDLR participants, where the researcher was not funded to create a formal report, but was invited to access and comment on the reports created by others. In all evaluation and doctoral research activities the researcher was guided by and adhered to the British Educational Research Association Ethical Guidelines (BERA, 2004).

4.9.1 Collaboration with others as part of project activity

During the course of project evaluations for CS2-Stòr and CS4-PROWE the researcher received the assistance relevant to the research reported here from:

- **Dr Anne Hewling**, as PROWE Project Officer during the first year of the two-year project, led the technical set up at the OU and moderated online activity. She conducted an online survey which is referred to in the thesis and was also reported in Hewling (2006). Dr Hewling facilitated the focus group meetings which the researcher led at the OU. She provided briefings on the project which are referred to and referenced and supported and provided feedback on the online activity of OU participants.
- **Roger Dence** facilitated CS5-PROWE research at the UoL. He conducted a survey which had restricted circulation and so is not referred to here, although the researcher had access to the results. He identified potential UoL interviewees and introduced the researcher to these and provided other general information and feedback on the UoL context and activity.
- **Dr Chetz Colwell** conducted the accessibility evaluation for CS5-PROWE and CS2-Stòr projects and provided technical and expert input to the research design. Dr Colwell also acted as demonstrator in recordings on accessibility produced as part of the project evaluation feedback.
- **Dr Anne Jelfs** assisted in the CS2-Stòr project, facilitating the research and acting as co-observer on the first of the two data capture suite sessions. The questions used for the interview sessions, and the analysis of the interviews prepared for CS2-Stòr were

discussed with Dr Jelfs, but the design of these and the analysis presented to the project, were the researcher's own work.

Other OU and UoL colleagues within these two projects from whom assistance was received in setting up, conducting and reporting on evaluation were: Anne Gambles (OU), Susan Eales (OU), Gill Needham (OU), Jane MacDonald (OU), Mick Jones (OU), Dave Perry (OU), Gilly Salmon (UoL), Richard Mobbs (UoL) and Tony Churchill (UoL).

Chapter 5: Experiences of reuse through an initial exploratory case analysis

5.1 The individual cases

Chapters 5-6 set out research at the microenvironment level, as described in Chapter 1. The six cases, introduced in Chapter 4, are considered in turn, with each providing a different context through which to observe the experience of reuse and reuse facilitation. Stake (2006), writing about multi-case research uses the term *quintain* to describe the wider phenomenon being researched. He points out the tension between case and quintain, what he describes as ‘the case-quintain dilemma’ (Stake, 2006, p7). The final four chapters of this thesis therefore consider *both* the individual cases *and* the research quintain – resource reuse activity within UK HE over the period 2003-2010. As Chapters 2 and 3 illustrated, this was a period of complex change within UK HE at the macroenvironmental level, with considerable shift in mesoenvironmental interpretations of how to facilitate resource reuse. Reuse activity within the case microenvironments reflects this complexity, both at the level of the individual case and when making comparisons between cases. Consideration of activity within and across cases, and comparison of these was necessary to develop an analysis of the wider phenomenon and develop understanding of what factors identified in individual cases were generalisable to other contexts.

Analysis of each case sets out sufficient contextual information for readers to understand the ‘situationality’ of the case (Barela, 2007). Within each case factors were identified relating to reuse within that context, focusing on those which were particularly well represented or case-

distinctive, while also recording others. How each case contributed answers to the three research questions was also noted.

There was no direct programmatic link between the cases as each operated independently (even where they occurred within the same organisation). However, there were themes and trends observed, particularly in addressing mesoenvironmental activity. Each case had its distinctive story to share, but CS1-H806, which related to the OU's Learning in the Connected Economy online course, is presented in particular detail as this played a leading role. Chapter 5 focuses on that case, which is the most extensive in the thesis. The remaining five cases are presented in Chapter 6, with separate case conclusions for each.

In Chapter 7 the factors identified in Chapters 5 and 6 are compared across the cases. Figure 7.1 (oversize insert) presents a comparison of factors across cases in summary form. This contributes to a broad descriptive model about reuse facilitation informed by the research within the case microenvironments. In each of the cases, the contribution to addressing the three research questions is identified, including what Yin described as 'rival explanations' (Yin, 2003, p112).

5.2 The role of Case Study 1: H806

Yin described the exploratory case study, as one where 'fieldwork and data collection were undertaken prior to the final definition of the study questions and hypotheses' (Yin, 2003, p6). CS1-H806, fulfilled that exploratory function in this research. During 2002-3, at the start of the research period, and immediately prior to it, the researcher drew on planning and writing of H806 to inform the initial research and the research questions. This case, and in particular, the experiences of reuse arising from it determined the course of the research and provided a point of comparison for other cases.

The researcher maintained involvement with CS1-H806 as a participant-observer, throughout the course's seven year lifecycle. This provided opportunity for the researcher to return to examine reuse beyond the initial period of research, and to review the effect of the learning objects composition beyond the initial research in 2003/4. Within the set of six cases this is the only case where it was possible to track reuse activity from planning the activity to discontinuation of the activity. The case served not only an exploratory, but also a descriptive and explanatory role in the microenvironmental analysis.

5.2.1 Context of H806

This module was offered as part of an OU's Master's degree in open/online and distance education, and also as a stand-alone course leading to a postgraduate certificate. It was offered from 2003 to 2008, (i.e. six annual presentations). Initial design and creation of H806 resources occurred between April 2002 and April 2003, with some minor updating in subsequent presentations. Reflecting the terminology used at the time within this thesis H806 is referred to as a *course* (this is equivalent to what the OU, from 2010 described as a *module*). Development and teaching of the course was led by the Institute of Educational Technology (IET) throughout.

It is important to emphasise that H806 in 2003, and during the period when reuse was occurring, was not typical of other OU courses. The factors that made this course *unusual as an OU course* are identified below. This comparison with more conventional courses within the same institution identifies key differences within H806 which may have led to an unusual level of reuse of its resources.

Before proceeding to note differences, it must also be acknowledged that within the context of UK HE, OU courses are unusual in being directed at learners taught at a distance from the institution. OU teaching is also distinctive in that the creators of the content (central academics) are not usually the same staff as those who teach and support students (tutors or associate lecturers). These differences are particularly evident in the production and presentation of OU learning resources (discussed further in Section 7.3.1). While growth in online learning across UK HE had by 2010 led to some convergence in the type of resources used within distance education and campus-based teaching, this was not so evident at the stage when H806 was first created and later reused.

Setting aside the difference between resources created for online distance learning and those created to support face-to-face teaching, there were seven distinctive features which set this course apart from other courses *within* the OU distance learning course-production system at the time. These are further explored in the remainder of Section 5.2.

5.2.1.1 The OpenCambridge collaboration

H806 was developed in collaboration with another UK HEI, Cambridge University. Cambridge Programme for Industry (CPI), led the Cambridge University contribution, which involved academics from the Judge Institute of Management Studies (the Business School within Cambridge University). The Institute of Educational Technology (IET) acted as the lead from the OU, with the partnership described as OpenCambridge. The use of the term ‘open’ did not imply relaxation of entry requirements (H806 was a postgraduate degree course with standard student recruitment requirements). Nor did the word suggest engagement with open content or open educational resources. These were not topics covered in the course and not part of its approach to creating resources at this time.

H806 was marketed using the crest of both universities, with the OU holding the rights in the course, although both HEIs could reuse content within it. The involvement of another HEI within the design process, may have led to selection of topics and creation of resources different from that achieved using an OU-only course team. For example, several cartoons were commissioned as assets within H808 with a view to reuse at Cambridge in presentations to be used in face-to-face instruction. This work was led by a Cambridge academic who selected the artist and based content on his face-to-face teaching requirements. Apart from these images, no other examples of reuse of H806 resources by Cambridge University staff have been reported. The examples of reuse activity outlined in Section 5.3 were initiated by the IET members of the course team, or arose from their activity.

5.2.1.2 UKeU pilot and UKeU platform

H806 was one of three pilot courses for the new UKeUniversity (UKeU). As only three courses were to complete a single annual presentation during the life of the UKeU this is also an unusual feature of CS1-H806. The UKeU required its courses to structure themselves as a set of learning objects (see Section 5.2.1.3). However this was not the only effect of association with the UKeU, a five-year programme aiming ‘to offer better educational content, better means of delivery and better service support than has ever before been available for online learning’ (UKeU, 2003a, p2). This aspiration to reform course delivery was to be addressed through development of a bespoke UKeU learning content management system (LCMS) and learner management system (LMS).

The UKeU platform was evolving over a parallel timescale to that of H806 content development. So, although some technical specifications were shared in advance, the final platform specification was not confirmed until *after* the majority of development activity for

the course was complete. The course team were not therefore writing the course resources for use within a specific and familiar platform, but for an uncertain and unfamiliar one.

This uncertainty, ensured that the H806 creators developed activities and content which were 'platform agnostic'. It was a requirement of creating reusable learning objects that no specific assumptions should be made about the VLE to be used. For example generic terms such as 'forum' were to be used rather than specific references such as 'Blackboard discussion' or 'FirstClass conference'). However, beyond this, the H806 team *could not* design the course to suit a specific familiar platform as the final nature of the platform was not known.

Correspondence and presentations from this period indicate that the course-team approach was to write a course that would 'run on anything' (Weller, 2003). Where the course required use of a specific tool the solution adopted was to link to online tools and systems outside the UKeU platform, for example Harvard's H₂O turn-taking conferencing system (Weller, *et al.*, 2005). This had the effect that any potential reuse of H806 resources would also link to these open external sites rather than the password-protected UKeU platform.

During its course life H806 was run on several different platforms, shifting technical context without necessitating changes in the content. The same H806 content was *used* within the UKeU VLE (2003-4), *reused* on the OU eDesktop (2004-2006) and then *reused again* on the OU Moodle teaching platform (2007-2008) when all IET courses migrated to this system.

Derivatives of H806 have also been reused within other systems: the OU Relevant Knowledge website, the Web-College platform of Beijing University (Ding, 2006), and the OU Knowledge Network (an online knowledge management system based on a community of practice model and developed by IET) (McAndrew, *et. al.*, 2004). While the use of SCORM content packaging was supported by the UKeU system, facilitating initial transfer to the eDesktop, the platforms within which H806 was subsequently reused did not support automatic transfer. The relatively

easy *interoperability* of the content in this case arose from the design approach (platform agnosticism applied to learning objects) rather than the technical wrapper.

5.2.1.3 Decision to use learning objects

The decision to create H806 as learning objects was initiated by the UKeU, which required that all courses developed for its platform should be structured as learning objects. As noted in Section 3.3, there was no clear agreement about what this term meant and the three pilots adopted different approaches (Section 5.4.1). The definitions used by the UKeU emphasised granularity, with an implied preference for smaller size (high granularity). For example: 'A learning object is the term used within the UKeU Learning Environment to describe the smallest bit of learning' (UKeU, 2003b, p15).

In 2003, there was not only uncertainty about what a learning object *was*, it was an untested concept within UK HE in terms of its effectiveness for learning and teaching, and none of the H806 team had experience in using RLOs in course design. Robin Mason had researched the potential of learning objects through the CLEO (Customised Learning Experience Online) Lab project, an OU/Carnegie Mellon collaboration concerned with applied research into technical, pedagogical and interoperability issues related to the ADL Shareable Content Reference Model (SCORM) (Rehak and Mason, 2003). This equipped the course team with a high degree of theoretical awareness of RLOs.

The creation of the H806 resources as learning objects was considered by the course team to be the principal reason for their reusability (e.g. Mason, 2006), although other factors, as noted within this section, may also have been significant.

5.2.1.4 Other ‘pre-versioning’ preparation

The CURVE (CoUrse Reuse and VErsioning) project whose work was referred to in Section 3.4 was co-located with the H806 team in IET. Keir Thorpe, CURVE project officer, attended early course production meetings and suggested a ‘pre-versioning’ approach to make the course as reusable as possible. ‘Pre-versioning’ required structuring of a large OU course into ‘blocks’ which were self-contained to allow efficient extraction for reuse as single short courses. The course team created four blocks within H808, each with a theme which could be offered as a stand-alone segment. However, although segments from H806 were later reused as short courses this was based on selecting resources across the range of learning objects, and crossed the block ‘boundaries’. Pre-versioning as blocks may have been a redundant approach as learning objects already offered sufficient potential for flexible reuse and a greater degree of granularity.

5.2.1.5 The H806 course team

Although all three main IET authors were experienced OU staff, two were newcomers to IET recruited specifically to write the course. Martin Weller was seconded from the OU’s Technology Faculty and Chris Pegler moved from Learning and Teaching Services (LTS), where she had had a management rather than an academic role. Also writing for the course were Cambridge University academics and external consultants (Section 5.2.1.1).

OU course teams are based on encouraging, often requiring, each member of the team to read and comment on successive drafts of the module in progress, including work written by other members of the team. This was the case with H806, however in this course comments were invited at the level of individual learning objects (often as little as 1 hour of student activity) rather than at the level of a unit, representing 1-2 weeks student activity.

One consequence of writing the course as learning objects was that its development did not need to follow a linear pattern. Learning objects did not need to be written in succession and did not cross-refer to other resources (unless these were ‘narrative objects’ (Weller, *et al.*, 2003a) written as a study guide as a final stage). This meant that any author, including consultants contracted to write a single learning objects, could proceed independently and receive feedback on their work even if delivering this out of sequence. All authors were writing standalone RLOs, rather writing at the level of a course unit. Only in the narrative objects was there any need to reference content within other course resources.

During the planning and writing of the course each learning object was allocated a place within a study week, sequencing of objects which the UKeU system required. However, as H806 used learning objects which did not *require* study in a particular linear fashion (unlike usual OU courses) the order of individual objects could be shifted as writing progressed. An online table of content in development (see Figure 5.1) provided links to each learning object so that course team members could view progress and access draft learning objects for review.

There were nine version changes to this course-in-progress index during the writing period, reflecting significant changes in the ordering, duration or sequencing of learning objects. Within conventional OU course production only minor and infrequent changes in the sequence of topics is possible once writing is in progress.

This approach allowed a form of *reuse* of resources during the writing process as learning objects created for a specific slot within the course were moved to different positions within the course. In the second and subsequent years of presentation, H806 learning objects were again re-ordered in response to student feedback. The same resource was reused within a different part of the course. This shifting developed an appreciation of the ‘stand-alone’

approach to writing the resources, which may have led to a more flexible view by course team members of how the learning objects could be reconfigured. Moving the position of learning objects was something that occurred in each of the examples of reuse arising from H806 (Section 5.3).

Figure 5.1: Online index for part of H806, Block 2, showing links to learning objects

Week	Activity	Author	Time (hrs)	Portfolio
8	Background of change in the connected organisation and in organisational learning (education, organisations, technologies)			
	Introducing learning and the connected organisation	CP	-	No
	Pressures and changes in the new connected economy	CP	2	No
	Changes in organisational learning strategies and technologies	AC	3	Yes
	Trends in work and e-learning	CP	3	Yes
	Organisational learning debate: Part 1 (Preparation and research)	CP	4	Yes
	Intranets, portals and knowledge networks: Part 1	CP	3	Yes
	Training/education glossary	-	-	
9	Organisational learning - the impact of the internet			
	Unit introduction, includes animation: Doing things right vs. Doing the right thing	CP	-	No
	Different levels of connectedness	GW/NP/MB	3	No
	Learning in new styles of networked organisation	HW/RP	2	No
	The future of learning in a connected organisation	AC	3	Yes

Revising the analogy of Lego blocks, (Section 3.3.1), H806 was viewed by the course team as a temporary structure which could be pulled apart and reconfigured quickly. This may have encouraged them to see opportunities in breaking the course apart and reusing its components in different contexts once its initial development was complete.

5.2.1.6 Very fast-track production

The H806 course team came together for the first time in April 2002 to create a course for use by students in January 2003 (students started H806 in March 2003, following a delay in roll-out of the UKeU platform). This period of nine months compared with a typical OU new course development lifecycle of three years. A two-year OU course production cycle was in 2002 considered to be 'fast track'.

It is possible that the speed with which the course was produced, coupled with uncertainty about the platform, and the learning object structure, led to course team decisions that would not have otherwise occurred. As shown in Figure 5.1, the structure allowed easy replacement and re-sequencing of activities. This could be extended to allow the substitution of learning objects which were not working as anticipated. The course team recognised at the time that this allowed them to take risks because problems could often be addressed by moving or replacing the learning object. This helped the team to reach decisions about the content technology use within individual learning objects quickly in the face of uncertainty. Any risk was contained within the boundary of the learning object so H806, at worst, did not have to 'live with the consequences' beyond a single presentation. The costs of rectifying any problem were confined to its replacement or adaption (plus in some instances editing of the narrative object that referred to it). These were trivial compared to those incurred when restructuring a heavily inter-connected course. Although this aspect of the use of learning objects was not in itself seen to promote reuse, it suggests an additional benefit to adoption of this granular and stand-alone approach to resource writing. Although used to create an online course, this approach could have also benefitted offline, print-based, OU course production.

5.2.1.7 Educational technology expertise

The IET members of the course team had a level of ICT competence, and experience in the design of elearning, which were unusual within the OU at this point, and perhaps would still be considered atypical. Martin Weller had a background in teaching ‘telematics’ and had led both production and presentation course teams for the undergraduate-level online course, T171: *You, Your Computer and the Net*. First presented in 2000, with c.12,000 online students and c.700 online tutors, this was the first large scale OU course to be mainly taught online, and also the largest course at the OU at the time. Robin Mason had chaired the production and presentation of the earliest OU online course (H802: Applications of IT in open, online and distance education), launched in 1998. Beyond the OU Mason and Weller were known internationally for innovative work with educational technology. Although new to academic writing, Pegler had previously advised academics on how to operationalize new teaching technology within OU systems and tutoring online for T171.

Any OU course team is assembled from the strongest writing team available. For an online course about online learning, experience in that area was necessary. However, this team offered unusually strong operational as well as research knowledge about e-learning. They were therefore well equipped to initiate and respond to opportunities for reuse, as individuals, and as members of IET – a central department with links to all the OU faculties. The topics they were engaging with in H806 as a course, were also ‘hot topics’, not only with students, but also with OU staff. It was this interest that led Pegler to offer parts of the course as professional development within the OU (Section 5.3.3). The H806 team, as experienced e-learning practitioners (particularly Mason and Weller), *as well as* the coverage of the course, were in demand at this time. A different OU course team, working within a faculty other than IET, offering a course which was not so topical, may have attracted fewer opportunities for resource reuse.

5.2.1.8 H806 as an OU course

Having identified the differences in H806 it should be noted that, in many respects, the course was not dissimilar to other OU courses. It was designed to be studied alongside other 60pt courses within IET's MA in Online and Distance Education (MAODE) programme. This determined course size, level and assumptions about the nature of the audience, for example student access to and competence with technology. Underlying course-production processes, the system for agreeing and assuring assessment, and the roles of part-time tutors teaching it, were no different from other OU online courses. These OU-specific approaches may have eased the intra-institutional reuse that followed as H806 learning objects were generated for an OU context despite the differences from other OU courses. These were not generic, de-contextualised learning objects (Section 3.9) and when reuse occurred it occurred within, or in relation to, H806's original institutional context.

5.3 Four examples of formal reuse

Both formal and informal reuse of learning objects within H806 occurred. Informal reuse was not usually recorded, as OU staff required no special permission to access the learning objects once the course was hosted on an OU platform (from mid-2004). One example noted by the researcher involved supply of a learning object on 'blended learning' to a team developing a research bid in this area. An IET colleague specifically requested that this be used to enable the research team to reach agreement on understanding of the term. The learning object was 'ready to use' and sufficiently focused (i.e. granular) and self-contained that it could be used out of its usual context. It was distributed as a file attachment by email.

Within twelve months of publication of the course three formal reuses of the H806 content had occurred. These were as a new course (T186), as additional content to an existing course (H850) and as staff development resources (Hot Topics). Each is described more fully below.

5.3.1 A short OU course (T186)

In 2004 Martin Weller created a new OU course (T186: Understanding e-learning: a guide for teachers and learners) by reusing parts of H806. He took 20 learning objects from H806 and added 12 new learning objects, which he described as ‘mainly narrative objects’ (Weller, 2004). T186 was offered as an entry level undergraduate course by the Faculty of Technology (the faculty from which Weller had been seconded to IET). T186 was a short course (one sixth of the size of H806), within the Technology faculty’s Relevant Knowledge programme offering short courses of similar size. Using the CURVE typology of versioning (see Figure 3.2) this was principally *resizing* (i.e. a smaller course). Reuse in T186 also involved *level adaptation* (from postgraduate to undergraduate) and *transnational* reversioning (moving from a course intended to attract international students, to one which was principally a UK student audience). Weller recalls that even where there was reuse there was also some level of repurposing:

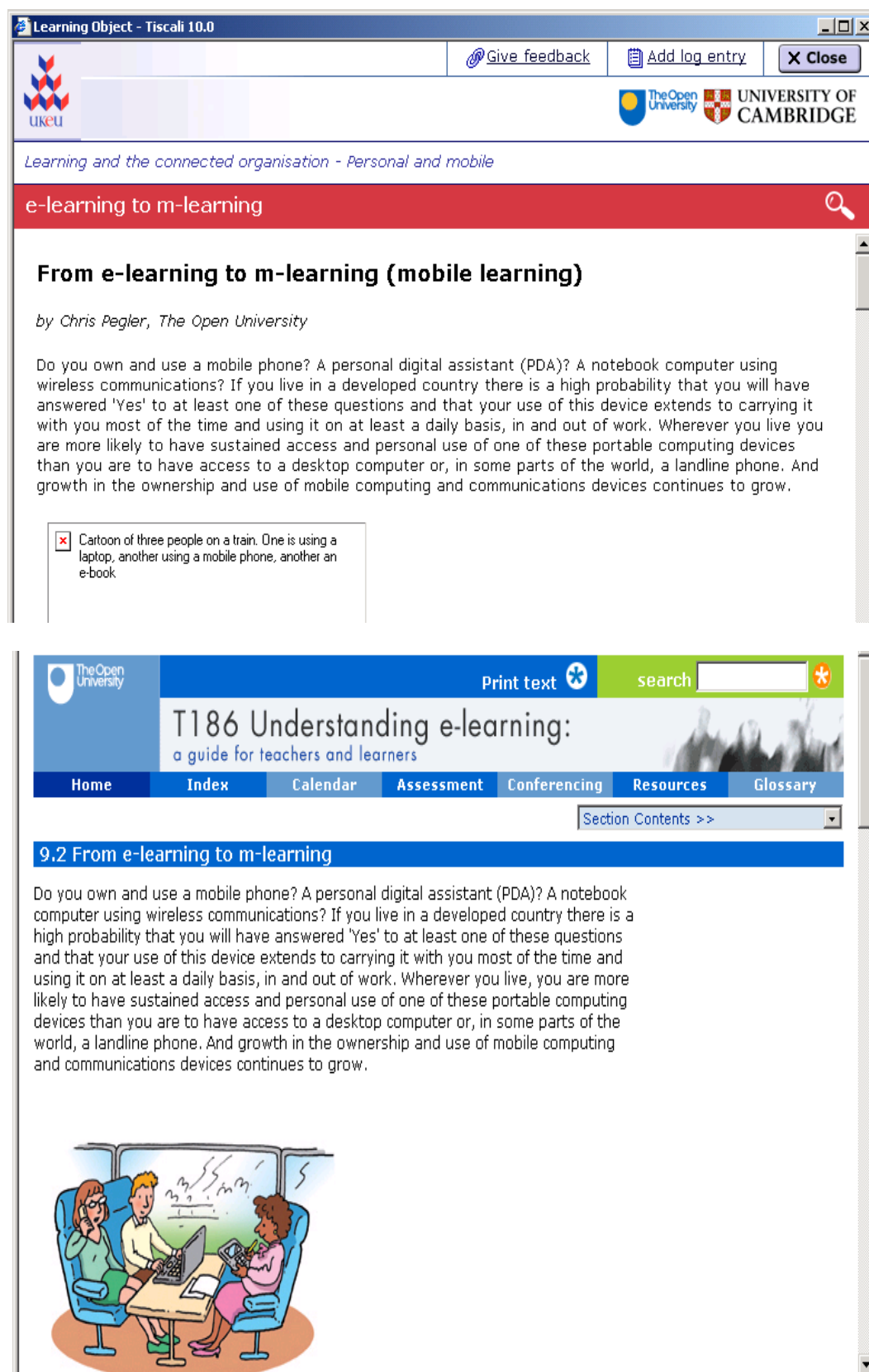
In nearly all cases the objects had to be reversioned to meet the needs of the different audience on T186. The typical alterations required to objects were:

- Level of student direction: at masters level the instructions for students were less explicit and directive.
- Case studies and scenarios: LCE [H806: Learning in the Connected Economy] was aimed at a global audience and so case studies and scenarios reflected this, whereas T186 was aimed primarily at a UK audience.
- Intensity of activity: some of the activities were removed or simplified for T186, given the shorter timeframe and introductory nature of the course.

- Range of readings: LCE [H806: Learning in the Connected Economy] made extensive use of external articles, but many of these were removed or alternatives found to meet the different time, level and interest focus of the T186 audience (Weller, 2004, p298)

Weller's alterations to the readings took account of other changes, including the reduced size and the different level of T186. This is a greater level of change than was required for the second example, H850 (Section 5.3.2), which was studied at the same postgraduate level as H806 and within a course of the same size. However, Weller calculated that even with the repurposing changes, the amount of time taken to create the new course was approximately one sixth of the time usually required. He observed that this time saving was within what was already regarded as a fast-to-production course process (the Relevant Knowledge series). Since the time required for other activities (e.g. setting up online forums, course meetings, appointment of tutors) would be unaffected by reuse, Weller's calculation suggests that creation of new content alone accounted for the main part of the academic time in creating an online distance taught course (c.83% by his estimate).

The new course T186 was also taught using a different LCMS. Figure 5.2 shows how the same content appeared in the UKeU and then the T186 platform.

Figure 5.2: Same learning object on UKEU and OU Relevant Knowledge platforms

Source: H806 student website, 2003 and T186 student website, 2005

5.3.2 Online addition to a print-based course (H850)

In summer 2003 the researcher joined the course team for an established, largely print-based course, The Postgraduate Certificate in Learning and Teaching in Higher Education (H850). This was another 60pt postgraduate course within IET, but within a different programme and with a different course team. Her brief was to introduce coverage of e-learning and update or replace existing content on resource-based learning. She took 27 learning objects from H806, and devised a new set of units within the course (45 learning objects in all, including 25 created from the 27 H806 objects). She also revised the content and the format of other parts of the same module so that these could be studied as online learning objects. As occurred with the shift from H806 to T186, the new learning objects included several narrative learning objects. Again there were some changes to texts and references, where these were not available to H850 students. In addition, as this was not (unlike T186) primarily an online course, there were some changes to the activity required within online groups. There were no other changes to the content.

Reusing resources allowed the researcher, in her teaching role, to rapidly create a *cross-media version* of this block of the course (CURVE, 2004), adding 100 hours of student activity, within a development time frame which had been expected to allow only minor amendment. The new course also used a different LCMS, the OU's standard website, its eDesktop platform (see Figure 5.3).

One driver for reusing rather than writing new resources on H850 was that this course was nearing its last presentation with a replacement course planned. In 2005 Pegler joined the production course team for this successor course, H812: Postgraduate Certificate in Academic Practice, where she again implemented a learning objects approach to authoring resources.

Figure 5.3: Learning object reused on H850 (OU eDesktop system)

Source: H850 course website, 2005

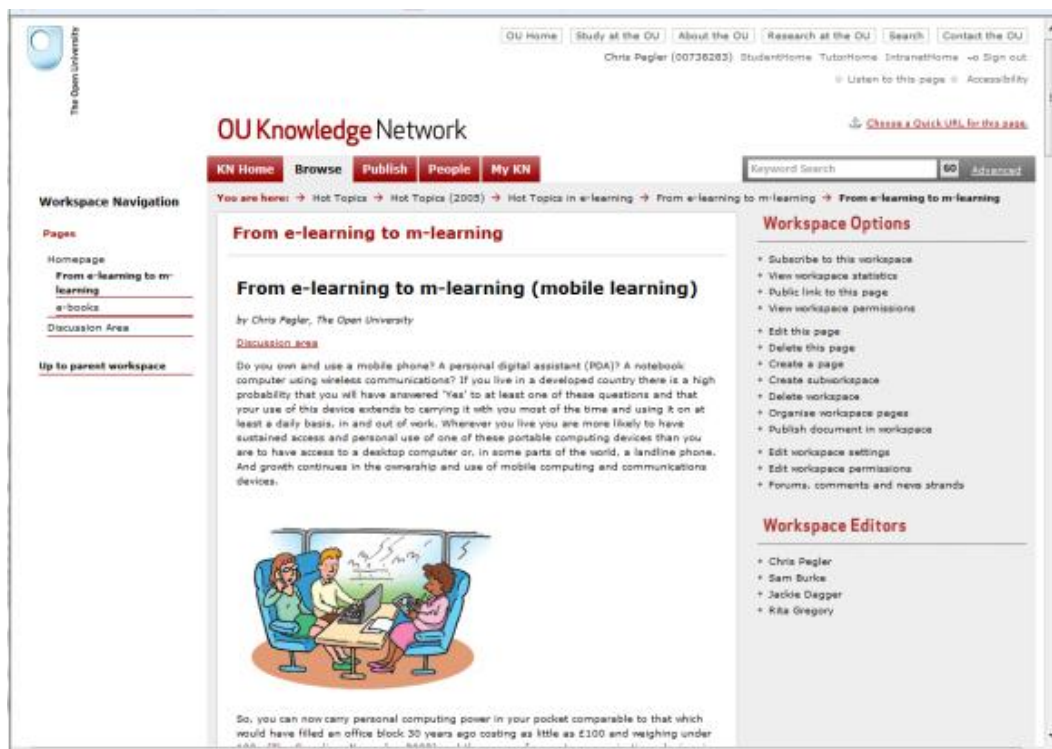
5.3.3 Reuse as staff development resources (Hot Topics)

The students studying H850 were teaching and learner support staff working in HE, mainly in the UK. Those studying T186 were teachers in schools, colleges and universities. Influenced by the effectiveness of the earlier repurposing, the researcher (in her role leading staff development) assembled smaller sets of learning objects (three sets of six) to create a non-assessed, non-formal online, staff development initiative for OU staff. The three sets of learning objects were presented as separate 'series': *Hot topics in e-learning*; *Thinking about learning objects*; and *The connected learner*. The titles and selections were based on the researcher's assumptions about what would prove popular to OU staff, but also reflected which learning objects available from H806 could be easily combined into sets. Their

composition reflected both 'marketing' and 'production' drivers, what users had available and what was available to reuse.

The Knowledge Network was designed as a repository for information rather than teaching resources, but as it provided a narrative guide within the workspace display, there was no requirement for narrative learning objects and no new learning objects were created for this initiative. As with T186 and H850, it was necessary to repurpose the resources to remove activities related to assessment and remove reference to readings not available to the participants. In making those changes the duration of some learning objects was shortened, to create a set of resources with consistent timings and to better suit non-formal study. Unlike formal staff development 'courses' on offer at the OU there was no requirement to gain a manager's endorsement in order to sign up for these non-formal learning options.

The term series was adopted to differentiate these from a course, but there was no requirement that they be studied sequentially. A cohort of 20 learners for a pilot presentation of each of the three short series was proposed, however registrations drew twice the level of interest expected, attracting 120 registrations by 60 OU staff within four weeks. This reinforces observations made in Section 5.2.1.7 about the popularity of e-learning as a topic for study at this time, and could also reflect the reputation of the H806 course team (Section 5.2.1.5). A survey of learners at the halfway stage showed that 97% would consider studying another 'course' within the Hot Topics series if they were attracted by the content (Pegler, 2004), suggesting satisfaction with the RLO format consistent with that of H806 students (Section 5.4.2). Hot Topics was a further successful reuse of H806, which without the existence of *reusable* learning objects would not have occurred. It was the existence of a bank of reusable resources that led to the idea of this reuse.

Figure 5.4: Learning object reused in Hot Topics (OU Knowledge Network)

Source: Hot Topics page on OU Knowledge Network, 2005

5.3.4 Reuse in translation (OpenChina course)

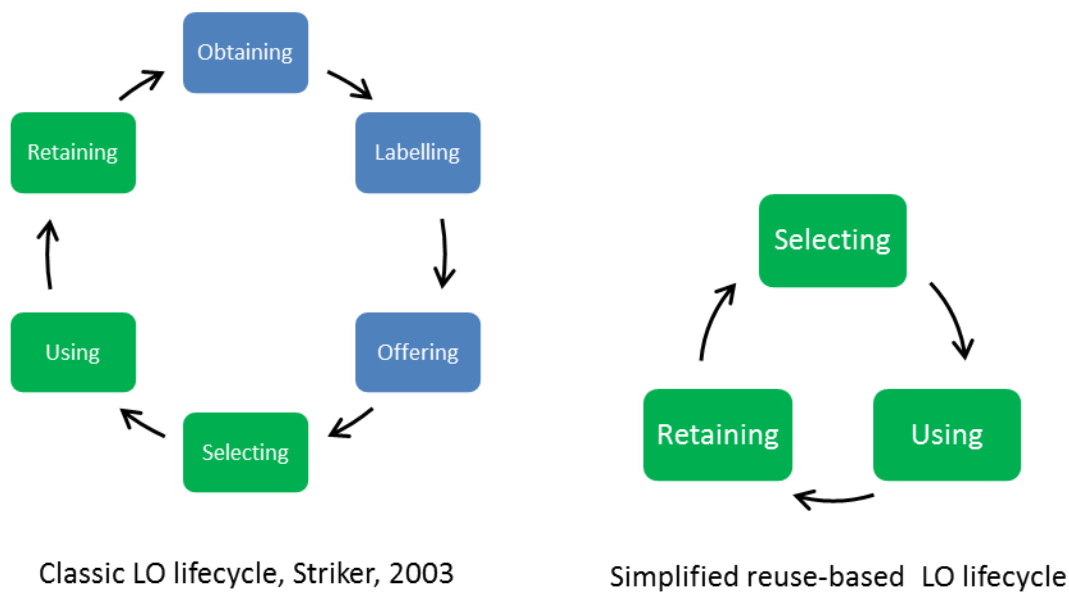
Following an agreement between the OU (OU Worldwide and IET) and the Consortium of Modern Distance Education for Chinese Universities (Beijing Zhengfeng Jiahe of Cultural Development Ltd., Tsinghua University, Web-College for Medicine of Beijing University, Beijing University for Foreign Studies and Capital Normal University) learning objects from H806 were during 2005/6 translated into Chinese. With the addition of further China-specific resources, the translated H806 learning objects, which had been selected by IET with advice from the H806 course team, were used as a short one-off taster course to assess the feasibility of introducing into China the OU's MA in Online and Distance Education programme (which included H806).

The taster course was offered over six weeks (May-July 2006) and used 22 learning objects

drawn from across the four blocks of H806. These were supplemented by three learning objects, on the theme *China's elearning: Challenges and Responses* written by the Chinese chairman of the project Professor Xingfu Ding, and a face-to-face workshop before the start of the course. The technical platform used was provided by the Web-College of Medicine of Beijing University and the course was studied by 40 students (Ding, 2006). In terms of the reuse activity, there is no indication that the materials were changed apart from translation and the addition of China-specific context as a separate section at the end of the course.

5.3.5 The shortened lifecycle of local reuse

Three of the four examples of reuse mentioned here (T186, H850 and Hot Topics) were implemented by the creators of the resources, or members of the course team. Although the contexts for reuse were different from H806, this was nonetheless reuse and repurposing by users who had a high level of familiarity with H806. They had written, or at least reviewed, this content themselves. This reuse activity did not require engagement with the earlier stages of Strijker's 'classic' learning-object lifecycle (see Figure 5.5). CS1-H806 reuse activity might be thought of as following an abbreviated lifecycle comprising *selecting* (where there was already a high degree of familiarity with the resources), *using* and *retaining* (i.e. uploading to the new teaching platform).

Figure 5.5: Classic cycle and abbreviated reuse cycles compared

Source: adapted from Strijkers, 2004 (Figure 1.4, p16)

Even where the resources went through an additional stage of translation to Chinese (Section 5.3.4) this reuse was undertaken following two years of discussion with the OU, which involved IET as a partner and advisor. To further reinforce this connection, the Chinese coordinator, Mr Chengui Duan, enrolled on one of the other courses within the MA ODE programme (H802: Applications of IT in open and distance education) which included content written by Robin Mason.

As with the previous three examples the OpenChina reuse presented an abbreviated learning object lifecycle, although the use was complicated by repurposing into another language and the addition of extra resources, face-to-face teaching and evaluation (Ding, 2006).

5.4 Case Study 1 – Distinctive themes explored

For each case explored in this research distinctive, and potentially significant and generalisable themes arising from it and related to reuse are identified and analysed. Three such themes relating to H806 activity are described below as being relevant to the reuse activity, although not in themselves examples of reuse. These relate to: deciding what type of learning objects H806 would consist of: the acceptability of learning objects to H806 students: and the implications of local reuse. This last issue relates to proximity in reuse, which is also explored later in this thesis as a cross-case modifier (Section 7.3.2).

5.4.1 How to decide what a learning object is?

The design of H806 was the first opportunity for members of this course team to actively engage with learning object creation and design. Given the lack of clarity about what learning objects were, a variety of approaches was possible. The three UKeU pilot courses, each adopted a different interpretation of what learning objects were. Sheffield Hallam University (SHU) produced learning objects which were larger than those in H806, following a modular structure not dissimilar to its other Masters courses. The University of York approach, included a larger number of learning objects and ‘assets’ than used for H806. These included multimedia learning objects developed specifically for the UKeU platform.

One possible interpretation of these differences is that the two pilots with extensive experience of online learning (OU and Sheffield Hallam), created learning objects consistent with its existing approaches to online course design. The York University team, who were new to elearning, relied on external consultants at Oxford University (TALL – Technologically Assisted Lifelong Learning), for technical advice. They produced a more granular and

interactive style of learning object, which conformed more closely to the mesoenvironmental theory on learning objects at the time.

The OU's approach was informed by IET's research into learning objects including discussion with Dan Rehak (Carnegie Mellon) and Terry Anderson (Athabasca University), well known researchers in learning objects and elearning. Rehak and Anderson worked on research projects with Mason and were visiting fellows at IET during 2003.

Although seeing learning objects as very different from the usual OU course design approach, the H806 team retained a format for the learning objects (largely text with some images and animations) which they were already comfortable with. They quickly adjusted to writing learning objects and were surprised that students, in survey comments (see Section 5.4.2) did not recognise that the construction of H806 was very different from other courses. That the authors felt comfortable in writing within their own style of learning objects, one which had similarity with other OU material, may have contributed to the speed and ease with which they engaged with repurposing these within other OU contexts.

The H806 emphasis upon text rather than multimedia contrasted with RLO practice within other UK HE initiatives such as the RLO-CETL, where a whole course was not created. Unlike Downes' example of the sine wave function multimedia learning object which was costly and difficult to produce (Downes, 2001), the H806 learning objects were technically uncomplicated and relatively simple to replicate. Although this would appear to offer less incentive to reuse, extensive reuse did occur and, as Weller (2004) pointed out, reuse of even these relatively simple resources represented significant cost savings.

The H806 learning objects possessed:

- **relatively high level granularity** – typically each object offered 1-2 hours student activity time. Although less than the usual OU ‘unit’ (measured in weeks) this was still high given wider assumptions about greater granularity being desirable for reuse (Section 3.7).
- **SCORM compliant metadata** – as a condition of upload into the UkeU system. Pegler and Weller, who input the H806 metadata found this task boring and time consuming, particularly given the slowness and lack of shortcuts within the UKeU system, which was still under development at this stage. They provided minimal repetitive metadata and the metadata provided was not, because of the local reuse that occurred, used. Had they been providing metadata for RLOs which were to be shared more widely this may not have been the case, but H806 was primarily written as a course, rather than for reuse.
- **self-contained in terms of content** – with the exception of links to external or dependant resources (assets within a RLO) and the less reusable ‘narrative learning objects’ (Weller, *et al.*, 2003b). The narrative objects were necessary as the UKeU system could not otherwise provide a study guide narrative equivalent to what Wiley (2005) described as the ‘mortar’ holding in place and contextualising the content (learning object ‘bricks’). Links to external (non-course) content were absolute rather than relative web links, so continued to function if learning objects were moved within the course, or reused elsewhere.
- **non-linear design** – As noted in Section 5.2.1.5 this created unanticipated benefits when developing H806. The potential for students to customise navigation through the course, was an attractive pedagogical by-product, permitting unusual scope for customisation or

personalisation within the constraints of a distance taught course, although the UKeU system enforced sequential numbering and arrangement of resources.

The period during which this course was developed and first offered to students was significant in marking the transition from theory about the value of RLOs (mesoenvironmental level activity), to course design and teaching practice (i.e. microenvironmental case level activity). Learning objects *created* as learning objects (Category 1 definition RLOs within Figure 3.1) had not previously been used in UK HE courses, although they had been used in some UK corporate and training contexts (Epic, 2010). The timing of this case contributed to its value as an explanatory case involving reuse of learning objects. While decisions about the size and shape of the H806 learning objects did not precisely reflect some RLO theory, these were sufficiently close to be classed amongst other Category 1 definitions. The examples of reuse noted in Section 5.3 demonstrate reusability. These H806 learning objects also fulfilled some of the pedagogical expectations of learning objects (Section 5.4.2).

The H806 team described their resources as ‘learning objects’ rather than ‘reusable learning objects’. Mason later used the term ‘holistic’ learning objects (Mason, 2006), distinguishing these as more complex or compound forms of RLO. The course authors were aware of meso-level theory about learning objects. Through adaption of this into practice and through their publications, they informed and developed that theory (e.g. Weller, *et al.*, 2003b).

5.4.2 The student experience of reusable learning objects

For the H806 course team, reuse was not their primary purpose in creating ‘reusable’ learning objects, they were responding to a requirement to do so (from the UKeU). Like other educators designing a new course, they were principally concerned with the effectiveness of

the design approach for learning and teaching, rather than its theoretical roots. Pedagogical effectiveness and reuse were connected as if the RLO approach proved ineffective there would be no incentive for reuse. In 2003 the H806 team were particularly concerned about the influence on pedagogy, and nearly a decade later similar questions have been applied to practice-based open educational resources (OER) – what impact do these have on learning and teaching, and what differences occur through use of these? (JISC, 2010)

Chapter 4 noted that surveys and interviews were used with H806 students following the first two course presentations (2003 and 2004). Both sets of students identified technical problems arising from use of the UKeU platform. This was particularly the case in 2004 when a sudden migration from the UKeU platform *in mid-course* was required when the UKeU closed at short notice. Because of the unusual effects of this one-off change, only 2003 interviews (with 32 students) are referred to here. Those students experienced the learning object-based course design of H806 as the authors had originally intended.

Thirty students from the 2003 cohort were interviewed at the end of their studies on H806, including three who did not complete the course. This represented all contactable students who studied H806 in that year. Questions were informed by an earlier survey which asked about online/technical experience and educational/professional background. Five open-ended trigger questions were used in the telephone interviews, which followed a semi-structured format. Students were asked these questions about the experience of learning with learning objects as one of seven broad areas relating to H806:

1. What was your general feeling of the way the course was constructed?
2. Did it feel different from other courses you have studied?
3. Did you find your study patterns were different in any way?

4. How did you choose which objects to study?
5. Would you have liked more variety in the type of learning object?

Few students (4) expressed dissatisfaction with the learning object construction of the course, and this dissatisfaction was in three cases conflated with comments on problems of access and technical navigation. Two students mentioned that the course was 'disjointed' and two others that it was difficult to see the whole course because of the fragmentation into learning objects (a further two students made similar comments but related these to the whole course not being available online at the start rather than the design as learning objects). More students (8) felt that they benefitted from a structure which allowed them to study in a non-linear fashion, than had criticised it (4). Four of those who felt they benefitted stated that they had chosen resources out of sequence to suit the available study time.

Students identified different strategies for choosing how they studied the course with thirteen attempting to study all of the learning objects (in some cases because they were initially unaware that this was unnecessary). Twelve prioritised or gave more time to learning objects of particular interest, an option which learning objects had been hoped to provide. One of these commented that this was in contrast with other parts of the MA programme where 'you did everything regardless of interest'. Nine students said that they read or skimmed all the content, from interest or as an aid to focusing on a selection. Only four stated that they had studied H806 in the linear fashion in which the UKeU platform presented the material. For two of these this decision was associated with wanting to tie their activity schedule to that of other students to improve online collaboration opportunities.

Significantly, two-thirds (21) of the students offered no opinion on whether H806 felt different from other courses studied, or considered that there was no difference. This, together with the

students' satisfactory performance in assessment, the positive comments of the external examiner, and feedback from tutors and in the online forums led the course team to conclude that the use of learning objects was beneficial to the majority of H806 students. While seven students expressed interest in a greater variety in the type of learning objects (five requesting more use of multimedia and two asking for more technical activities), there was no dissatisfaction expressed in the *quality* of the course or the learning objects.

The feature of learning objects most frequently commented on by students was the requirement to choose between them. This was an issue not necessarily directly associated with course construction as learning objects, but rather to an assessment strategy which allowed choice. Mason, *et al.*, (2004) noted the variety of student-led approaches possible when allowing choice between learning objects as assessment evidence (only possible with a course which was constructed from granular stand-alone resources). This was a radical change to the norm in distance-learning assessment, where students were expected to follow a set path through the course content with limited options for variation. With the new approaches adopted in H806 and reported in Weller, *et al.*, (2003b), the course team were satisfied that the use of learning objects was acceptable, and in some cases beneficial, to students. They continued to use this approach in later courses developed for IET.

5.4.3 H806 and local reuse

The rationale for reuse exemplified by the theory around learning objects at this time (i.e. the mesoenvironmental view) was based on reuse by large numbers of users and/or reuse by other than the creators. Strijker's learning objects lifecycle, a typical view of learning object activity, assumed stages of *obtaining*, *labelling* and *offering* prior to selection for reuse.

However, as H806 illustrated, where the creator and user are the same person, or are very proximate to each other there was no requirement for these early stages. For example, there

is a clear importance and purpose in *labelling* (attaching metadata or tags to a learning object) when sharing resources nationally or internationally, between parties that have no prior experience of each other. It is this *labelling* which will determine what is selected for consideration for reuse. Emphasis on *labelling* occurs where sharing is via a national repository, rather than an institutional one, as observed within CS2-Stòr.

As Figure 2.1 showed, the economic advantage in sharing resources can derive from sharing with few, rather than many. Weller (2004), in the example of T186, showed that there could be substantial savings in time when resources are reused within the same institution. With intra-institutional sharing, such as described in Section 5.3, there were likely to be technical and operational advantages, e.g. cleared rights for institutional reuse, availability of assets within production and delivery systems. There was also more likelihood that the resources shared would suit the teaching approaches and culture of the HEI. If there is such a thing as ‘not-invented-here syndrome’ then using material within the same institution should counter the worst effects of this.

It has been suggested that some of the reasons why there was enthusiasm to reuse H806 related to the team that produced it. Mason and Weller were respected as researchers and educators in this field, with a track record of success that would have inspired confidence in using resources they had authored. It is reasonable to assume that reuse of material from a known and trusted source would be more likely to attract interest than where the source is previously unknown, a view which was also expressed by participants in CS5-PROWE. This was at odds with the mesoenvironmental view that sharing of resources without prior experience of the source was at this time was one of the main advantages of learning objects reuse.

What is notable in CS1-H806 is that intra-institutional use was led at a local level. While the reuse occurred between faculties (IET *and* Technology), and between programmes (from the MA in Online and Distance Education to the Postgraduate Certificate in Learning and Teaching in HE and Relevant Knowledge programmes), and between types of course (from external formal student-facing to internal non-formal staff development), and from one partnership initiative to another (OpenCambridge to OpenChina), H806 creators were instrumental in all of these. Brosnan (2006, p218) points out that recontextualisation requires additional effort, even where resources originated within the same organisation. This is less of a problem (operationally and culturally) where the distance between creators and reusers is very limited as it was here. The issue of proximity is one which is considered in more detail in Section 7.3.2.

5.5 Case Study 1: Other factors

Three distinctive themes which were particularly relevant to interpretation of the case have been explored above. For four of the five remaining cases three factors are also singled out for comment and analysis, however for all cases factors beyond these three distinctive factors were also noted. These other factors were logged as case-specific lists and have been presented for comparison in Insert 7.1 (over-size insert). Analysis of these occurs in Chapter 7.

5.6 Case Study 1: Conclusions

During 2003-5, when this case's main reuse activity occurred, the IET researchers involved (who were also members of the course team) attributed that reuse to the structure of the resources as stand-alone learning objects. They presented this view in several presentations and papers (e.g. Weller, *et al.*, 2003b, Mason, 2006).

The H806 learning objects were written with a clear idea of a specific context for use, and written in anticipation of use with a specific, familiar, audience. That this did not appear to limit opportunities to reuse was surprising at the time as this ran counter to a number of mesoenvironmental views. Specific deviation from these occurred as:

- **Resources were not rich in multimedia.** MERLOT, the best known repository of learning objects at the time, and Downes' famous example of the sine wave RLO (Downes, 2001) were examples of emphasis on multimedia as a particularly attractive format for reuse. The RLO-CETL was also to emphasise this approach. The H806 learning objects were largely text-based.
- **Reuse was based on intra-institutional initiatives.** The H806 learning objects were shared only within the OU and its partners. Sharing more widely would have been technically possible but did not occur. This course pre-dated the OU's later engagement with OER which would be focused on sharing *resources* (small parts of a course) rather than, as with these examples of reuse, constructing and sharing formal *courses*.

Although the OU is an exceptionally large HEI the range of opportunities for reuse arising from a single course were surprising. Reuse as staff development resources (Section 5.3.3) and as a taster course for an overseas partner (Section 5.3.4) were uses which could have occurred in institutions of much smaller scale. As Section 2.5.2 pointed out, the economic efficiency of sharing RLOs where costs are to be recovered, or financial benefits illustrated, favours sharing across smaller numbers of similar contexts rather than many distributed ones without prior connection. However, sharing across a large number of diverse users (despite its higher costs and greater uncertainty) continued to be the assumed economic objective of reuse initiatives.

- **Low level granularity and repurposing rather than reuse (as is).** When Mason (2006) described H806 learning objects as *holistic* she was describing something akin to the open courseware resources now familiar as OpenLearn OER. However the structure and media used for H806 resources made them relatively easy to resize (e.g. by modifying the activity or assessment to require less student activity time), which allowed repurposing as well as reuse. All four examples of reuse involved some repurposing for their new context. This was somewhat surprising as they occurred within the same organisational context and were reused alongside other resources written by the same authors, so in similar style.
- **Sharing was initiated by the author(s) and there was no requirement for a technologically-mediated repository service or metadata.** The examples of reuse prevalent in mesoenvironmental literature at this time suggested that the reuse would involve other educators or developers, whose discovery of the resource would be mediated by a repository-like service reliant on complete and accurate metadata. Metadata was considered a prerequisite of sharing. In CS1-H806 although metadata was created this was not used to facilitate reuse. Those proposing reuse already had more detailed knowledge of the resources than that shareable through metadata.

The authors of the learning objects had a clear focus on the creation of a *course*, with onward reuse a hypothetical by-product rather than the main purpose of their work. This is one of the main differences between CS1-H806 and the other five cases. That these resources were later found to be reusable in several other intra-institutional contexts, and used across different LCMSs was technically unsurprising to the authors, who knew that reusability and interoperability were characteristics of learning objects. The four reuse examples were of effective opportunistic reuse resources whose format was stand-alone and more granular than the normal OU course unit. That these learning objects were reused so extensively without

actively targeting reuse at the creation stage was notable, particularly given their deviation from the RLO theory what was considered to make resources optimally reusable. They presented particular challenges to assumptions about generic writing, granularity, repurposing and the relationship between creators and reuse.

The course team could be considered to operate as a small, highly specific, community of practice within which the learning objects and reuse opportunities circulated. They each has a thorough understanding of resource availability, were very familiar with the resources and had some personal involvement in the reuse, which occurred in response to specific motivation (e.g. to provide a taster of IET course material in Chinese). This type of sharing within a community of practice is closer to the ideals of later repository systems, e.g. HUMBOX and Language Box and LORO (linked in CS3-LORO) and CS6-NDLR, than it was to more formal approaches adopting mesoenvironmental values such as CS2-Stòr (with emphasis on metadata) or CS4-SORRS (which emphasised generic approaches to writing RLOs).

The exceptional proximity between authors and reuse in CS1-H806 removed barriers to reuse that would have otherwise existed. It eased the task of assessing quality and suitability for a new context, and reduced the need for negotiation on reuse between participants.

Operationally it reduced technical difficulties, e.g. rights clearance. The influence of proximity is explored as a cross-case modified in Section 7.3.2.

In CS1-H806 addressing the pedagogical problems of teaching with learning objects was the immediate focus of the course team's attention. They were creating an online course within a programme which attracted students who were themselves lecturers, online tutors, educational technologists and e-learning consultants. It was once H806 production was largely complete that the course team discovered opportunities for reuse. Unlike the other cases, the

reuse activity was incidental to the *obtaining* (in this case creating) of the resources. There is some irony that the extent of effective reuse appears greater in this case than in others where resource reuse was the prime objective.

Chapter 6: Further five cases exploring reuse

This chapter presents the remaining five cases studies. These are treated here in less detail than CS1-H806, which had an exploratory function, and CS6-NDLR, which presents work in Irish HE is presented in less detail than others.

6.1 Context of Case 2: Stòr Cùram

Stòr Cùram was the earliest of the external (i.e. non-OU) cases researched and the case for which facilitation of reuse of resources was a main objective, rather than a by-product of other activity. This was a national project, funded by the Scottish Executive (Scotland's governing body) through the Scottish Institute for Excellence in Social Work Education (SIESWE) from October 2003 to July 2005. It aimed to establish a repository of learning and teaching resources to support social work education across the nine Scottish universities teaching this subject. The OU in Scotland was one of these, although core OU teaching resources, including those for Scottish social work students, were produced by academics based at the central campus in Milton Keynes, England.

The project had three main partners: University of Strathclyde (which acted as lead institution), the Robert Gordon University and the University of Edinburgh. It proposed to develop and upload 50 learning objects as the basis of a new repository. The resources would be determined by social work teaching priorities identified in consultation with all nine Scottish HEIs. A specialist hub was based at Strathclyde University. Additionally, an elearning advisor was located on campus at each of the other two main partner HEIs. Like other cases examined in this thesis (e.g. CS3-SORRS and CS6-NDLR) there was an overt brief to support the transition to e-learning: 'its about embedding e-learning practice within blended learning to transform

social work education in Scotland' (Currier, 2005). The project objectives also mention delivery of 'the new social care curriculum' (Stòr Cùram, undated). As observed when comparing the mesoenviromental view of reuse with the macroenvironmental push towards this, reuse can support changes in wider learning and teaching practice and this appears to have been the objective here.

At its launch as a service in November 2005, the repository which the project team referred to as 'the Stòr' was re-branded as SIESWE's *The Learning Exchange*, and described as 'an educational service enabling the sharing of learning resources for the whole of the [Scottish] social care workforce' (SIESWE, 2005). Publicity from this period suggested the repository would: 'deliver learning resources to the desktops of social care educators and learners; promote connections between educators, learners and learning resources, and; involve users in the continuous improvement of the service' (SIESWE, 2005). In 2007, the Learning Exchange and SIESWE, became part of the Glasgow-based Institute for Research and Innovation in Social Services (IRISS). The Learning Exchange within IRISS continues to operate in 2012, providing online access to learning objects, similar to those reviewed in this research, but within a more open system (i.e. no log in or other restrictions on viewing and using the objects).

Stòr Cùram is a Scottish gaelic term which can be translated as 'storehouse of care'. The use of a Scottish gaelic name reflected the project's Scottish roots which included close links to other Scottish research activity in elearning and specifically in reuse of digital content. The Stòr librarian and metadata expert, Sarah Currier (based at the University of Strathclyde) was co-located with JISC's Centre for Educational Technology and Interoperability Standards (CETIS). As that name suggests, this Centre was involved directly in tracking technological research and practice relevant to online resource reuse. CETIS was actively engaged in supporting, disseminating and critically evaluating research and practice related to RLOs. Currier had, prior

to joining the project, been co-ordinator of the CETIS Educational Content Special Interest Group (SIG).

There was significant Scottish-led research and practice-based activity relating to reuse of digital online resources. In 2003 Allison Littlejohn, while a Senior Lecturer at Strathclyde, published an edited book on reusing online learning resources, which remains (in 2012) the only UK-led book on this subject. This publication was influenced by Allison's involvement in establishing an electronic Scottish Staff Development Library (SeSDL), based at Strathclyde, 'designed to address an identified national shortage of high quality electronic resources for staff development' (Littlejohn, 2003). The SeSDL project was not only a national library with a specialist focus similar in scope and rationale to Stòr Cùram, it acted as a catalyst in founding Intrallect. This was a spin-off venture from Edinburgh University, led by Charles Duncan, which developed intraLibrary, the most prominent provider of repository systems used within UK HE. Stòr Cùram was an early adopter of intraLibrary, which was also adopted by Jorum (June 2004) and later by the RLO-CETL, at that time the two most influential large scale reuse repository initiatives serving UK HE. The intraLibrary system was also used, during the research period, by CS6-NDLR. Littlejohn, Duncan, and Currier, all involved in Stòr Cùram, had previously been members of the SeSDL project team so could draw on that experience. This reflects the circulation of project staff previously noted (Section 2.5.5). Similar effects, again illustrating the carrying forward of practice from one project to others was noted in CS3-L₂O/LORO.

The researcher became aware of Stòr Cùram initially through the OU School of Health and Social Work (now the Department of Health and Social Care). Through this connection she was invited to put forward a proposal to evaluate the usability and accessibility of Stòr learning objects. She became evaluator in 2004, and maintained contact with the project until

completion of the evaluation and report in November 2005 (Pegler, *et al.*, 2005). Findings referred to in that restricted-circulation evaluation report are referred to in this thesis.

6.1.1 Stòr Cùram: Distinctive themes explored

In comparison with CS1-H806, Stòr Cùram was a larger (national) scope project. It also focused on facilitating sharing of reusable resources and developing an ongoing *service*. There was no expectation that reuse would occur within the lifespan of the Stòr Cùram *project*. However, in its approach to establishing a service, this project placed an emphasis on the role of metadata (a mesoenvironmental factor which CS1-H806 only minimally explored). The project also set out a commitment to ensuring accessibility within multimedia learning objects (a response to a macroenvironmental driver noted in Section 2.4.3). As only one of the Scottish HEIs was involved in distance education, resource reuse was expected to occur within a blended learning, rather than wholly online distance learning environment (the focus of CS1-H806). Reflecting the requirements of the primarily campus-teaching HEIs using the repository, Stòr Cùram staff anticipated that viewing and use of the resources would usually occur within face-to-face teaching, where students and staff were co-located. However, as the resources were stored and could be used online, this was not the limit to how they *might* be used.

Creating a set of learning objects suitable for ‘blended learning’, rather than for use mainly or solely online, freed the project from the challenge of addressing how to contextualise the resources within an online environment. This was the problem addressed by creating narrative learning objects in CS1-H806 (Weller, *et al.*, 2003b). If reusing learning objects within face-to-face or blended learning, teachers could re-contextualise the resources during presentation in the classroom. As noted in the evaluation report, ‘Many of the requirements placed on reusable learning objects, e.g. interoperability, are unnecessary if the learning object is being used within a blend which is predominantly face-to-face teaching’ (Pegler, 2007a). Technically

the blended approach also side-stepped constraints that delivery of multimedia learning objects could have created for off-campus students. Broadband was unavailable in some regions of Scotland until the end of 2005 and did not reach some Scottish islands until 2009.

Stòr Cùram did not assume that its users would rely wholly or even principally on learning objects for the teaching of a course. It also recognised that reuse of the learning objects, to replace existing resources was optional, a matter of choice for each social work lecturer. There was no requirement to use the repository, in contrast with CS4-SORRS. Many potential users of the repository were not using online resources within their existing practice and would need to be persuaded of the repository's usefulness. Some might be disinclined or even hostile to contributing to, or using, online resources. By adopting a blended learning approach the project was able to emphasise that these new resources would *work with* existing resources under the control of the educator. Stòr Cùram's repository could focus on supporting those aspects of social work teaching which were regarded as most difficult to teach in face-to-face settings, those which were best supported by digital resources, or those for which resources suitable for reuse already existed but may not be widely available. Unlike CS1-H806, there was no attempt to provide complete coverage of a course.

Describing the learning objects which were expected to populate the initial repository, Stòr Cùram differentiated between:

- new multi-media learning resources (which would be either conceptual learning objects of case-based learning objects);
- existing digital learning resources which would be incorporated 'as is'; and
- the contents of a resource exchange, contributed by individual teaching staff across the institutions (Stòr Cùram, 2005).

Once fully operational there was an expectation, similar to that of the UK national repository Jorum, that users of the service (institutions, departments or individual users) could also deposit resources. Engaging the community in depositing content was a more tentative plan and this stage of activity was part of the service (the Learning Exchange), rather than the project, although it informed design of the service by the project. The repository launched with new (bespoke) learning objects, and others which had been adapted from content drawn from commercial publishers (with appropriate agreement), or from institutions or individuals whose work was already known to the social work teaching community.

6.1.2 National repositories' need for taxonomies and metadata

The decision to generate a taxonomy as one of the Stòr Cùram deliverables emphasised confidence in the growth potential of the repository beyond the 50 learning objects planned for the launch. As further learning resources were added, users might need to choose between alternative resources, addressing similar learning objectives or topics, described or presented in different ways. By creating a user-informed classification system for the repository Stòr Cùram could make searching more efficient and effective for users. The team had experienced problems with metadata accuracy and confusion in user-generated classification during the SeSDL project (Littlejohn, 2003). By appointing a metadata expert to guide this new project they hoped to avoid those difficulties.

In expecting to share resources within a single discipline (social work/social care), the range of intended users was more narrowly focused than had been the case in either CS1-H806 or SeSDL. The resources made available in those initiatives were written for cross-disciplinary use (addressing elearning and staff development themes). This new repository was directed at a relatively limited audience of Scottish social work educators, with initially no expectation of unsupervised learner access. The project's commitment to developing a taxonomy, highlights

the project's concerns with reconciling the different vocabularies that searchers and depositors would employ, even while the learning objects addressed teaching within a single discipline area, and a single nation. Access to the Stòr required a login and password, so participation could be restricted. Had the repository been larger scale, cross-disciplinary, or accessible to a wider audience, the emphasis on active metadata management would have been less surprising.

Stòr Cùram's concern to address known problems with metadata, and its emphasis on formal metadata as a pre-requisite for effective resource reuse, reflected trends within mesoenvironmental activity to which project members were themselves contributing. For example, Currier's activity while a member of CETIS had emphasised the importance of high quality, accurate metadata (Currier, 2004a), and the project maintained close contact with CETIS. Jorum, the UK national repository in development during 2004/5 offers another example of this emphasis. That repository at one time employed nine staff to ensure the quality and accuracy of the metadata describing its resources. While Jorum maintained this quality assurance of metadata, checking and revising user-generated resource descriptions, it did not assess or seek to control the quality of the resource itself. While there was evaluation of the metadata there was no evaluation of the content that it described.

Both Stòr Cùram and Jorum were national repositories, which perhaps required a level of service sufficient to reflect that status, and encourage engagement from a broad range of potential users. The Stòr Cùram team appeared conscious of this responsibility. In a post to the public project blog Currier stressed the level of service that users expected:

It is important, in terms of the success of the project and its impact on social work education in Scotland, that users creating, depositing and delivering the materials are happy from the onset that their rights, and those of their institutions, are being

protected. It is also important that they are confident that they are using materials from the repository legally and in accordance with the rights of the other parties involved. We must also be aware of privacy issues. Due to the nature of reusable learning objects and the possible requirement for the use and storage of personal details (to determine and record who has rights to do what). (Currier, 2004b)

Although talking here about rights, the same claims could be made about other aspects of the repository, including the accuracy of metadata. Stòr Cùram anticipated that users of the repository would include many who were new to online and elearning, or unfamiliar with the function and operation of a repository. Importance was placed on developing a robust technical system and user-friendly procedures that busy academics would be willing to adopt. This was an additional technical requirement, in addition to the more obvious one of selecting content suited to user requirements. Although the scope of the resources was disciplinary, the service was self-consciously national, with expectations that it would need to scale up its activity if successful.

6.1.3 An emphasis on accessible multimedia

Stòr Cùram introduced a further expectation of its learning objects, that they be accessible to students with disability. This was a timely response to the disability awareness legislation noted in Chapter 2, however the project aimed to *exceed* the incoming legal requirements. Within social work practice many client groups suffer from disability, so the sector is sensitised to this issue. Meeting the requirements of the Disability Discrimination Act, and possible further requirements, was regarded as particularly relevant to this project, and was also relevant for other educational projects in UK HE. Stòr Cùram developers looked to international standards, (e.g. WC3 WAI, the World Wide Web Consortium Web Accessibility

Initiative) for guidance, linking the case (micro) objectives to those expressed in the wider macroenvironment. Multimedia learning objects were desirable for use in blended learning so the project gave priority to addressing known accessibility problems when using Macromedia Flash (Fernandez, 2005). Flash was a tool commonly used by developers at this time and creating accessible Flash outputs was a technical challenge beyond the scope of most educators or resource developers. Making available accessible multimedia resources was thought to have potential to motivate educators or institutions to reuse RLOs within the repository (Pegler, *et al.*, 2005).

As part of the project evaluation, four learning objects were selected by the researcher in consultation with Stòr Cùram. These were typical of the content for the repository and were fully developed, or in a final draft version. Accessibility testing devised in conjunction with, and executed by, IET accessible media expert Chetz Colwell (Pegler and Colwell, 2008), underlined the challenge of not only achieving accessibility using Flash, but maintaining accessibility with consistency over a range of resources written by different authors and over the lifespan of a learning resource intended for reuse. This challenge was one which all reuse initiatives faced where maintaining accessibility was an objective.

The researcher's analysis of Colwell's technical findings identified eleven recommendations which would improve accessibility (Pegler, *et al.*, 2005, p23). Of these seven related to inconsistencies within, or between learning objects. For example, *within* a resource varying the audio commentary without changing the transcript, or vice versa, could confuse students who were relying on one while the tutor using the other. Technical consistency between resources was also important as disabled students often needed to discover the navigation tools and accessible shortcuts. Ideally these should not differ between resources which may be used within the same course. Given the complex nature of multimedia resources, version control

was a significant issue in purely technical terms, without these additional accessibility concerns. With reusable resources created by different authoring teams, at different times, using different tools, the problems were compounded.

Making resources available for local reuse created additional problems. Where resources were to be downloaded, stored locally and adapted locally as part of reuse, further drift from the accessible ideal was likely to occur. This compares with storing a single resource online which could be maintained and updated by a trained team. As the researcher observed:

Accessibility is achievable but subsequent reversioning (repurposing) will create challenges for the repository ... the type of use that these [the resources] will be put to in practice – in particular the extent of any localised versioning – may degrade the usability and accessibility of the objects over time (Pegler, *et al.*, 2005, p5).

This was a particular concern as repurposing rather than reuse (using without adaptation) was emerging as the preferred approach within UK HE (Section 3.6). While repurposing activity and accessibility requirements were also considered within CS1-H806, the low use of multimedia there, the course team authoring approach and the high level of central control of repurposing, presented fewer challenges in maintaining accessibility.

It is difficult to see how a single provider, unless unusually large or well-resourced, could meet requirements for fully accessible multimedia resources intra-institutionally. The evaluation of accessibility issues for this project concluded that the difficulties encountered made the repository 'a very viable, sustainable and necessary approach to producing resources which are accessible and offering access to a range of alternative resources sufficient to effectively address most accessibility requirements' (Pegler, *et. al.*, 2005, p34). What this evaluation also

revealed, was a significant ongoing challenge in achieving accessibility where the repository was multi-sourcing multimedia and where local reuse or repurposing was anticipated.

6.1.4 Previewing resources to select for reuse

Evaluating the usability and accessibility of Stòr Cùram resources during 2005 included assessing their potential for reuse with educational users, using the IET data capture suite (Section 4.8.3). Four complex learning objects (presented as seven individual resources) were chosen from those assembled or created by Stòr Cùram. These were the same resources as used for accessibility testing. They ranged from a static webpage to complex audio visual sequences and interactive self-assessment, typical of educational multimedia, e.g. multiple choice quizzes, and identifying or grouping terms.

Both participants in the research were experienced lecturers in social work and one had specific experience of social work teaching in Scotland. Although based at the OU they had taught at HE level within other contexts (see Appendix 1). Each was observed separately, and asked to review the same set of learning objects, in the same order. These typically covered 30 minutes of student activity and it was suggested that they spend no more than 60 minutes on the exercise (based on an assumption of 15 minutes for the review of each resource). That proved to be an unrealistic timescale for reaching conclusions about the usefulness of the resource, for reasons explained below. Both sessions over-ran, with the lecturers agreeing to continue until all four learning objects had been evaluated.

As the lecturers had not selected these resources themselves they had not reviewed any metadata-generated, or other, descriptions relating to the RLOs. They were coming to the learning objects 'cold' with no prior knowledge or assumptions other than their background

knowledge of Stòr Cùram. They approached this exercise without a specific teaching need or context for reuse in mind, which may have influenced how they approached the exercise of deciding whether they might reuse the learning objects. While the objects were typical of those they may have encountered in searching for reusable resources, there was no certainty that these lecturers would have selected these particular objects for review if offered alternatives. They may not have considered searching for resources within a repository *at all* as neither had previously used a repository to search for resources. Both were however computer literate and comfortable with internet searching.

The format of the observation and the questions asked is shown in Appendix 2. The behaviour and observations highlighted here are those which illustrated the most generalisable concerns with reviewing learning objects of these types. These were all concerns which could be expected to influence decisions to reuse.

While the artificiality of this process – for example the need to address thirteen questions – may have slowed down the review process, it became clear that for each resource, and particularly for the multimedia learning objects, making a quick *and complete* review would be very difficult. Both participants expressed frustration in the speed with which they were forced to progress through the objects because of the audio and video elements.

In addition to the forced pace of progression through the screens, the resources were designed for *learning by students* rather *review by experts*. They included common multimedia design features which ensured that the users would need to undertake activity or press a button to proceed. In some cases it was not possible to view all of the content (e.g. all possible answers and all feedback options in a quiz) without working through the resource repeatedly. It was often not possible to return to earlier screens to compare terms having skipped these

previously. While this may be effective for learning, it made the review process lengthy and at times incomplete.

The two lecturers made comparison of the resources reviewed, in terms of visual appeal, usability and pedagogical approach, and also voiced expectations and preferences relating to how the resources were constructed and supported. Both suggested changes to the functionality of the content to include specific features which they knew were available to their own students through OU systems. For example: 'Is there any facility for keeping this record, these notes per individual student? It would be good to do that, being able to capture it ...' (STOR B, 2005). They indicated that they expected advanced functionality: 'it would be useful to have some way that you can jot that down and send it to some email. I don't know how you'd do it but I think it might be helpful' (STOR A, 2005).

Expectations appeared highest for the multimedia format learning objects. The participants both tried to click on images, anticipating that there would be some sort of image map or mouse-over pop-up effect, even where there was none. This may suggest relatively sophisticated users, however it also illustrated that a user could spend considerable time trying to discover the extent of a learning object's interactivity. Conversely, users could miss noticing that multimedia resources had specific interactivity features. This could lead to adoption of a resource for use with students, unaware of its full range of content. The most comprehensive metadata description of a learning object would be unlikely to reveal the full extent of the interactivity in assessment options, etc. within a complex multimedia learning object. To record this would be an onerous and specialist task and, if fully recorded, might not be helpful to the potential end-users. Such a record would create an extensive and technical document.

Further expectations were expressed about the online-ness of the resources. Both lecturers without prompting voiced assumptions that, as online resources, the learning objects could and would be kept up to date. They further expected that any additional content, e.g. links to further reading, would be updated as a repository service: 'If it's online and not on CD then what Stòr Cùram can do is tweak it all the time'. (STOR B, 2005).

In reality external links would suffer from 'link rot' if not actively maintained (Kiernan, 2002). In contrast to institutional repositories, national repositories would be presented with particular challenges in undertaking maintenance of links within resources which they did not own the rights to adapt or modify. The larger the scope of the repository, the more tenuous the connection between the provider and user, the more challenging updating would be. This 'maintenance assumption' about repositories also occurred in interviews in 2009 about CS4-SORRS (a smaller scale repository project operating within a single OU faculty, Health and Social Care). Emphasis on updating within two cases which concerned social work resources may be attributable to the impact of changes in law and policy within this discipline. MEDEV, the HEA subject centre for Medicine, Dentistry and Veterinary Medicine, in 2010 identified a similar issue. They noted that when supplying OER it would be important to identify when resources were updated or replaced and to contact users of these. This is a particular challenge when resources are widely circulated without controls such as registration, a trend within open repositories (Quentin-Baxter, *et al.*, 2010).

The time required to thoroughly evaluate a technically complex resource for educator use (as opposed to working through it as a student) was surprising. However, this reflected earlier observation by Westfall (2000) on the time invested to become familiar with someone else's teaching resources (in this case software):

The author found that, even though reuse could save time, it was not a substitute for preparation. To teach unfamiliar content, he found that it was necessary to spend a substantial amount of time studying the previously developed materials and working with the software. In some instances, he had to find and study other materials on the topic, to achieve the necessary proficiency. However he would have had to do this even without these materials. Since these materials were available, he did not have to develop the lecture notes and assignments that would have been necessary otherwise. (Westfall, 2000, p1856)

This quotation is reproduced in full to reflect the ambivalence of Westfall, echoed by the two lecturers observed in the case. While reuse could save time, there was a substantial investment in time to *prepare* to reuse, and commit to reuse (the *selecting* process). The more options in how the resource was used the longer the time taken to learn what the resource did and what it was capable of. These lecturers wanted to know what was behind the external links as well as what was within the learning resource. When the resource is multimedia the time taken to check its suitability may be especially extensive because it moves at the pace of the video or audio, rather than allowing scanning of text on screen.

In addition to the assessment of pedagogical appropriateness within a new context, technical checks would also be required for online resources, particularly where repurposing was intended. These could be conducted by support staff or the educator intending to reuse the resource, and could include checking of external links, ensuring that the rights clearances permit the new use, making sure that there was technical interoperability, or resolving any inconsistencies e.g. in navigation. A resource which was initially evaluated as effective educationally could later be discarded as unsuitable, as the result of these technical checks.

Beyond the technical and educational fitness for purpose, there were also indications in this research that presentation style and formatting choices could also have impact on the decision to reuse.

6.1.5 Personal preferences and expectations

Although no direct questions were asked about the appearance or format of the objects, both observers noted concerns relating to these. For example there were comments on the use of colour, the tone of voice adopted by the commentator, and the style of illustration. These were beyond concerns about content, comprehension and accessibility. While neither lecturer indicated that these aspects would in themselves prevent reuse, their comments suggested that these were aspects of the resource that the lecturers would have welcomed the ability to change, which has implications for repurposability.

Comments included the following:

- **colour of the learning objects:** ‘Gosh, that pink is weird. ... [later] but its personal taste, rather than anything else’ (STOR B, 2005).
- **font size:** ‘The font is a bit massive.’ (STOR B, 2005).
- **graphical treatment of images:** ‘It’s a very old picture, obviously chosen for a reason, but it seems rather arbitrary’. (STOR B, 2005)
- **size, shape and location of images and text on the screen:** ‘70% of that screen is unused isn’t it? ... [and] still I’m scrolling down, which is annoying. ’ (STOR B, 2005).
- **Tone and pace of the audio commentary:** ‘I found the voice over ... [pauses] ... I am sure it would be useful for people with sight impairment, but I find the tone of it a bit patronising, but maybe that’s me’ (STOR A, 2005).

The inclusion of photographs to illustrate the characters discussed within the learning object was intended to create visual variety and make use of the multimedia functionality. However, selection of specific images could cause distraction and lead to a search for a deeper relevance. The images were a mix of stock photographs and images created for the resource. One lecturer commented on the use of different images, within a single resource, to illustrate the same character: 'That's not the same woman is it? [indicating an image representing the mother in the case history] ... There's a woman looking out of the window with blonde hair, now she's dyed her hair' (STOR B, 2005). In this case the lecturer took time to move back to earlier screens to make the comparison. He pointed out that in social work practice, changes of appearance or changes in people within the family group, could be significant, so students would be alert to cues on this. In this resource there was not 'hidden meaning' in the character's altered appearance.

The use of vocabulary was also raised. One lecturer commented on the lack of explanation of terms or acronyms used: 'I just wonder if that term 'personal profile form' can either be explained or defined in some sort of glossary or something ...' (STOR A, 2005). This raised a wider question of how the learning objects would be supported, i.e. what technical explanations might be provided in the learning platform to allow different selections of individual objects to be represented in an appropriate glossary.

The reasons given for not selecting a resource, or for wishing to adapt it rather than reusing it unaltered, were more substantial than simple dissatisfaction with the appearance. STOR A and STOR B gave reasons such as inappropriate level, minor inaccuracy in the information, and the design. For example, referring to the approach to giving feedback: 'It's very linear ... that actually does not recognise the reality of different levels of students you get ... my impression is that it [the resource] is pitched too low' (STOR B, 2005); and 'That question has a number of

different answers, all of which would be true. I don't know if the system would actually be able to recognise that. But that is quite easily corrected' (STOR A, 2005).

Overall there appeared to be expectation that the resources in this repository would be better than those they could source within their own HEI. This emphasis on the need for assurance of quality could reflect an assumption that they would not undertake additional work to adopt a new resource without a clear incentive: 'What they [tutors/lecturers] want is depth, they want something that is not too difficult to give [to students], but at least as good as you can give in a live lecture'. (STOR B, 2005). These potential users appear to have made judgements about the *quality* of the resources in Stòr Cùram based on the status of the initiative (national repository), and the format and style of the resources (online and multimedia).

When these lecturers considered a resource to be reusable, the resource was expected to require some repurposing, including transfer to different presentational format to suit the OU teaching context. Although both distance educators, their views on reusing a text-rich webpage are consistent with what might be expected for reuse within blended learning: 'I would probably put that in a pdf, and carve it up myself and just pull out the bits that I wanted' (STOR B, 2005); and 'What I would want to do in teach[ing] is to customise it. So that I could select sections of it to do, and I would want that facility' (STOR A, 2005). They may have here been referring to reuse within face-to-face tutorials or residential school teaching, or online.

The affordances of face-to-face teaching include the opportunity to provide, in a spontaneous and responsive way, context and additional references. It is easier when co-located with students and communicating synchronously to answer queries about the sources underpinning a resource, or address doubts about the resource. Comments by these lecturers may indicate that learning resources for fully online or distance teaching (e.g. their own OU context), need

to meet higher requirements for quality than those used in campus-based settings where queries could be more immediately and easily addressed. STOR B acknowledged this in his comment: 'I guess for teachers in traditional universities, as long as it's referenced it doesn't have to be absolutely gold standard'. (STOR B, 2005).

6.1.6 Case 2: Other factors

For this case four distinctive themes which were particularly relevant to interpretation of the case have been identified and explored. These cover only some of the factors noted in the case which could impact on reuse, or potential or facilitation of reuse. Other factors were logged as a list (see Insert 7.1) and analysed as part of the cross-case comparison in Chapter 7.

6.1.7 Case 2: Conclusions

The emphasis within this national project, on creating reusable learning objects of high quality, including multimedia resources, within a formal system, was consistent with mesoenvironmental expectations around reuse and learning objects at this time. However, this project set up a repository with the expectation that participant HEIs would deposit resources as the service matured. That would create an increasingly diverse and less consistent mix of resources. While such a mix would be representative of the resources used in teaching social work, it was uncertain whether these resources, perhaps of less obvious high quality, would be reused. There was a disparity between the resources initially populating the repository (created or adapted by developers for online teaching), and the resources which were usually used by, and available from, the partner institutions.

The targets set by this project in terms of the quality assurance of metadata and fully accessible multimedia learning objects, created particular challenges. Had this been an institutional repository, or short term project, it is unlikely that such ambitious objectives

would have been adopted. Having aimed to agree upon and source fifty RLOs within a relatively short time period, the developers struggled to achieve consistent accessibility across the multimedia resources. The evaluation suggested that the progress made towards technical accessibility was valuable, and unusually thorough. It would be a difficult, perhaps impossible, task to achieve full accessibility with multimedia learning objects using Macromedia Flash, even with more time available. The evaluation process raised questions about how accessibility could be retained through successive versions if repurposing were to be permitted. This same concern applies to other aspects of quality, particularly technical functionality and metadata accuracy, whenever repurposing occurs.

The data capture suite observations contributed to understanding the decision-making process when reviewing and selecting unfamiliar resources. The reviewing of multimedia resources was shown to be a surprisingly time-consuming process.

The lecturers used to represent prospective users had wide teaching experience, and were prospective users of the repository. However, at the time of the observations both worked within the Open University which was not typical of the other HEIs involved. This may have affected their assumptions about what the resources *needed* to address as well as what they *should have* offered. They both expressed assumptions that the resources would be *at least as good as* the resources, or teaching that these replaced. This could have arisen from their practice as OU central academics, where they had access to teaching resources produced by expert technical teams. So, although asked to comment on behalf of a broader range of teaching staff, and with experience of several teaching context, the educational environment with which they were most familiar may have shaped their opinions. Other potential users may also have expectations shaped by their institutional practice. They may be comparing reusable resources to equivalents that they could make themselves, or which are otherwise available to

them. This could lead to differing expectations of quality and acceptance of different standards based on available alternatives. In providing multimedia, and accessible multimedia, as contents for the new repository Stòr Cùram was offering resources which most users would be unable to create, although since the launch of this repository (2005) opportunities to create online multimedia cheaply and effectively have increased.

This repository was primarily created to serve the needs of campus-based institutions with content selected and used by the educator, rather than searched on and accessed directly by learners (CS4-SORRS presents that option). Consistent with the intention that use would occur within blended learning environments, the service offered an opportunity for teaching staff to use resources selectively. This may have reduced the need for users to repurpose resources. Repurposing Flash-based multimedia was recognised as particular difficult for most educators.

As noted in Chapter 1, searching for resources created by others can be aimed at identifying ideas and influences rather than obtaining reusable content. If a quick scan of options was required, because of the slow speed in navigating between resources, the Stòr Cùram repository, and other formal repositories, would suffer in comparison with internet search engines such as Google. One lecturer commented on this, while acknowledging that with internet searches the quality of the resources discovered may be unreliable: '... you don't know how credible they are, but if you're starting to looking at a new subject with Google you can very quickly get enough material to give you an overview of a new subject.' (STOR B, 2005). For the purpose of acquiring influences or ideas, the strengths of Stòr Cùram's repository, e.g. credibility of the source, rights cleared for reuse, professional multimedia design, and accessibility assurances, may not be relevant.

As a project, Stòr Cùram was successful. It established a repository and, through migration to IRIS, elements of this remained in use. However, the time and effort required to create the

repository, and in particular to create fully accessible multimedia resources within it, was much greater than anticipated (Pegler, *et al.*, 2005). This is consistent with other cases within this research where the resources were created, or quality assured, as part of a centralised process (e.g. CS4-SORRS, CS6-NDLR). In Stòr Cùram the investment in developing taxonomies and the emphasis on metadata, was informed by the project staff's experiences of problems in previous projects. It was also a consequence of the project's aims to create a national repository, supporting sharing between participants who would rely on the metadata in order to select suitable resources. For repositories where there is less connection between users and depositors of content (e.g. cross-institutional, multidisciplinary, national, or international repositories) the quality of metadata has greater importance than when sharing within a smaller community, where users are already aware of the resources available or familiar with the work of the content creators. The observations in the data capture suite highlighted the amount of information that potential users required *after* having selected and downloaded the resources. This was information that could not be addressed in the primary metadata (i.e. metadata produced in advance of use), no matter how complete.

The repository contained resources which were made on a bespoke basis for the project, as well as those which were adapted from resources previously used in teaching social work. The creators could be already known to potential users, perhaps part of the same community of practice and therefore available to answer questions on past use. Although identification of authorship is not common within teaching resources, as there is usually no external publication of these, the authorship was noted in the metadata for the Stòr Cùram learning objects. CS5-PROWE suggests that the provenance of the resource (e.g. the reputation of the creator or the institutional brand) can serve as a quality indicator and used as a filter during selection, if this information is displayed. This would be similar to the practice common in reuse of research resources.

In common with other repositories of the period, there was no provision for reviewer-paced (rather than learner-paced) navigation within the resources. The process of learning enough about a resource to determine whether to use, was particularly extensive here because these were *multimedia* learning objects, so the pace of audio and video determined viewing speed. The educator wishing to reuse Stòr Cùram resources may spend considerable time selecting a resource, then learning how to use it (Westfall, 2000), as well as ensuring a technical and licensing fit with their own systems, uploading and inserting links to it. This effort can be offset against the effort required to create a complex multimedia resource, but does suggest that the time saving benefits of reusing multimedia resources may not be as straightforward as they seem. It also suggests that the existence of high quality reusable resources may be insufficient to lead to their reuse. Without a clear existing requirement for the resource, the effort required to select and use resources represents an additional expense.

6.2 Context of Case Study 3: L₂O and LORO

6.2.1 L₂O and LORO – a two-part case

The relationship between projects and the potential for these to build from each other has already been noted in Section 2.5.5. Case 3 describes and analyses two such projects (L₂O based at Southampton University and LORO based at the OU) which represent different stages within a multi-project continuum towards reuse. Examining these within the frame of a single case helps to illustrate how practice was carried from one microenvironment to another, as well as how the developments at the reuse mesoenvironmental view shifted and the implications of this in the design of projects and setting project priorities. As with CS2-Stòr, which progressed to an open access arrangement as IRISS, there is also a progression from closed consortium arrangement (the starting point for L₂O) to open access and OER (one of the objectives adopted by LORO).

6.2.2 Case context: L₂O

L₂O (Sharing Language Learning Objects) was a JISC-funded project based at Southampton University between Jan 2005 and July 2006. It provides a view of reuse facilitation through the lens of a JISC Distributed eLearning programme project. As the name suggests, the emphasis was on sharing language learning objects, in this case across a group of specified institutions including three other HEIs in the region (University of Portsmouth, University of Reading and University of Surrey). L₂O was a 'regional sharing' initiative within the JISC programme, so activity was initially focused on institutions in South East England, where the partner HEIs were based. It aimed to share experience in creating learning objects (practice), as well as sharing the resources themselves. The project was also aiming to share practice and content across HE/FE boundaries. Each HEI worked with two partners (FE or Sixth Form Colleges within the

region) as well as with the HEA Subject Centre for Languages, Literacy and Land Studies (LLAS), based at Southampton University.

As with CS1-H806, the UKeU was instrumental in Southampton's decision to create learning objects. The UKeU commissioned the Languages department at Southampton to provide online preparatory courses in English for Academic Purposes (EAP). Southampton was at this time (2003/4) also engaged in other UKeU projects through the Worldwide Universities Network (WUN) consortium, a group of HEIs which included York University, which also produced one of the three UKeU pilot courses.

Southampton University had already, by the early stages of L₂0, experienced reuse of learning objects developed for the UKeU. A course in Geographical Information Systems (GIS) written in collaboration with Leeds and Penn State Universities (both members of WUN) was used by Penn State students in 2005. Although the first presentation of the course, this represented repurposing/reuse. Penn State students accessed the RLOs on Southampton University servers, before the course, which had been written for the UKeU, was presented by Southampton. This unusual example of course reuse resulted from disruption in marketing of the Southampton-based course following the collapse of the UKeU. Martin and Treves reflected that:

the highly granular learning object structure meant that simple reassembly of most of the objects allowed a new version of the module to be created with minimal additional authoring. ... The first reuse of our content was thus to deliver essentially the same course to students at a partner institution. (Martin and Treves, 2007, p.779)

The EAP content was created to support students from outside the UK in achieving the level of proficiency in English necessary to study with the UKeU at Masters level. The Southampton

team had generated 1000 learning objects and assets for this purpose when, with the sudden end of the UKeU, these were no longer required. Unlike UKeU courses such as CS1-H806 and the GIS course described, there was no clear market for these learning objects as a free-standing course. These RLOs, and members of the team responsible, were brought into the L₂O project. Its aims were:

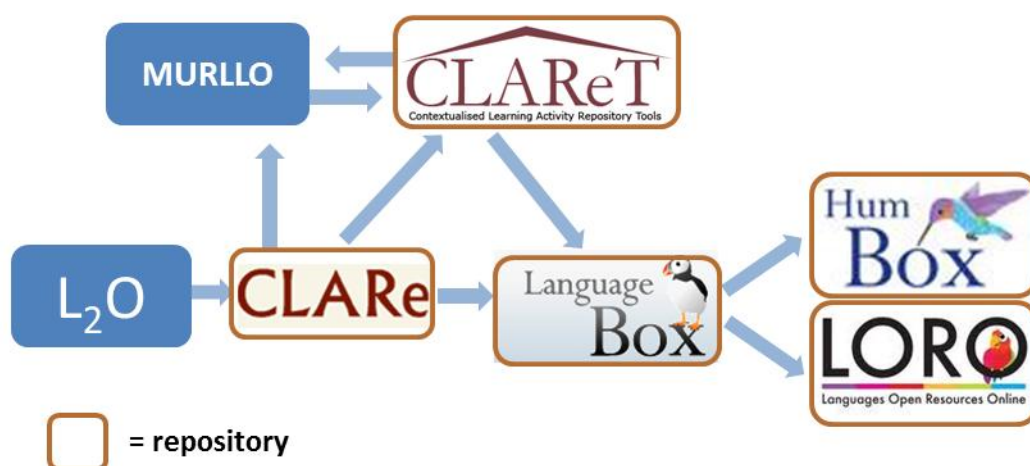
To share and disseminate good practice in the development of e-learning pedagogies and processes; To share and re-use electronic learning resources across institutions and across sectors; To move towards a culture of sharing and re-use of electronic resources within a regionally-based, cross-sector community of practice. (Dickens, *et al.*, 2007, p4)

As these aims suggest, the project was not focused primarily on creating a repository, but instead on establishing a community of practice to share expertise and resources. Initially regionally-focused, the project was successful in establishing a national community around L₂O activity and also developed a pilot repository, CLARe (Contextualised Learning Activity Repository).

CLARe was created as L₂O recognised that community-wide sharing required an area to support storage, search and retrieval of resources across institutions. It also, unexpectedly, became a conduit for continuation of L₂O activity once the project had ended. Further development of the repository occurred as part of the JISC-funded CLAReT (Contextualised Learning Activity Repository Tools) project (October 2006- October 2007). MURLLO (Management, Use and Repurposing of Language Learning Objects) (April 2006 to September 2007), an Eduserv-funded project, drew on CLARe and CLAReT to take forward development of tools to support work on contextual metadata, and the discovery and editing of learning objects. That activity fed into development of the Language Box repository (Millard *et. al.*, 2009). Like CLARe, Language Box was based on the EPrints research repository system used and hosted at Southampton for

research dissemination. HUMBOX, with a wider Humanities disciplinary focus and emphasis on OER, was based on Language Box and funded as a JISC UKOER Phase 1 project during 2009/10 (JISC, 2008). LORO, although set up as an institutional initiative was an OU adaptation of Language Box, developed in collaboration with Southampton. Figure 6.1 illustrates these connections.

Figure 6.1: Connections between repository systems



The Southampton team were already familiar with learning objects as a resource design at the start of L₂O, defining their own version of a learning object as: ‘a stand-alone, interactive resource which allows a learner to learn and/or practice a learning point connected with a skill, or a subject area’ (L₂O undated). Aware that other institutions were not so familiar with the design and use of learning objects, the L₂O team developed ‘a simple pedagogically-enhanced template and Dreamweaver toolbar for the creation of basic “learning objects”’ (Watson, et. al., 2008). L₂O offered support in use of its Learning Object Creator tool through workshops and also reviewed and adjusted learning objects produced by its partners.

The project team identified that the description of learning objects using standard forms of metadata was not sufficient to help potential users identify appropriate resources. To address this problem they developed a two-tier description for the contents of their repository, differentiating between learning objects (as defined above) and a smaller level of resource which they called a 'pedagogic asset'. This was a resource that could 'provide *particular potential for teaching*' (Jeffrey, *et al.*, 2007, p3), but was smaller than a learning object and could be stand-alone asset, or shared as a collection.

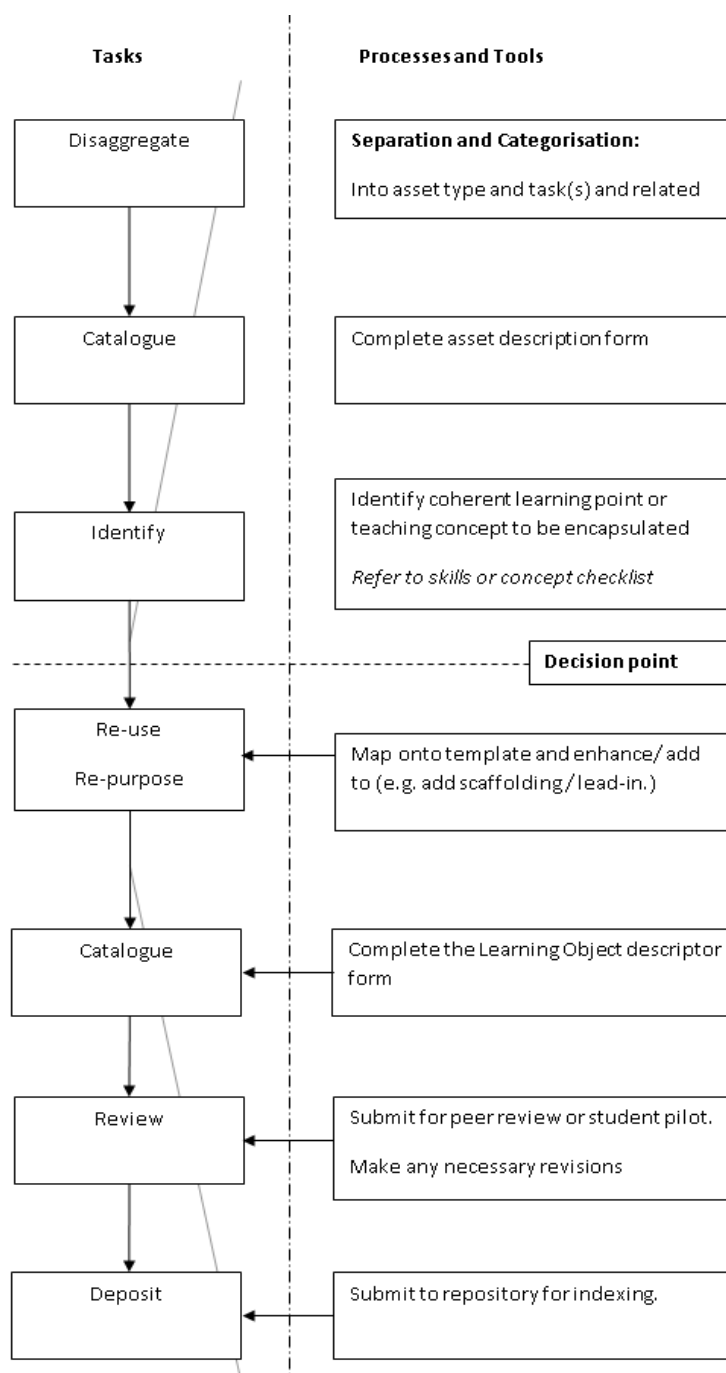
Section 5.4.1 noted that the three UKeU pilots pursued different approaches to creating courses constructed of learning objects within the same UKeU platform. The Southampton eLanguages department had taken a different approach to these in producing its RLOs for the UKeU. They placed emphasis on self-tests using online quizzes and on small media assets (audio and video). The latter were suitable for reuse within Languages teaching, but not fully described by metadata (a point made by Mason with relation to single images, noted in Section 3.7).

From the L₂O activity the Southampton-based team developed an interest in the potential of contextual metadata which they explored through an Eduserv-funded review. The emphasis they placed on obtaining rich and controlled metadata was typical of mesoenvironmental trends during this period, and consistent with these wider trends, the L₂O team recognised the problem of obtaining metadata from creators of resources.

The L₂O Final Project Report (Dickens, *et al.*, 2007) reproduces a schematic of their process for creating quality-assured learning objects with appropriate metadata within. This is reproduced as Figure 6.2. What this emphasises is the considerable effort invested before a decision is

made about whether to accept the resource and invest further effort in creating a reusable version.

Figure 6.2: Pedagogically-led 'Process Model' for L₂O



Source: Watson, 2007

www.elanguages.ac.uk/researchcommunity/projects/l2o/pedagogic_outputs_diagram.doc

This formal model has the advantage of producing visually and operationally consistent resources. In CS2-Stòr achieving consistency was identified as a challenge for a project with multiple, diverse, contributors. L₂0 staff provided quality checks and support, particularly for less experienced producers. For example metadata was initially catalogued when collected, and then re-catalogued after the learning object or asset had been repurposed by the L₂0 team (see Figure 6.2). The L₂0 staff took on this responsibility and also trained users. This relatively formal approach to controlling the quality of the metadata and the resource contrasts with the approach taken within the later Languages repository project, LORO, described below.

6.2.3 Case Context: LORO

Languages Open Resources Online (LORO) was a project set up to establish a repository using Language Box, a later version of the repository service set up as CLARe (see Figure 6.1). The project was funded by JISC over a period of 15 months (April 2009 to June 2010) but continued to operate and develop as a service after that funding source ceased. Based at the OU, the project team drew on the technology and expertise underlying the Language Box, so, in addition to offering a case study opportunity in its own right, LORO serves as an example of how repository initiatives supporting inter-disciplinary sharing have shifted over the period since the end of the L₂0 project.

Although the word 'Open' was always part of its title, LORO was primarily established to facilitate sharing within the OU's Department of Languages, using a customised version of the Southampton Language Box system. It initially operated as a 'closed' system within the department's intranet, not accessible to other users. LORO later changed to open access, allowing non-OU users to register, upload and download resources, although some deposits within LORO continue to be shared only with OU staff.

The shift from closed to open was not the only change in scope during LORO's project phase. In interview LORO A described her initial idea in establishing LORO as: 'to fulfil a very, very specific need which was for ALs to be able to share their own material with other ALs'. This was reuse activity which 13 OU regional centres (including Scottish, Welsh and Northern Ireland national centres) had previously facilitated, based on sharing within their geographical boundaries. The initial purpose of LORO was therefore more specific and closely defined than any of the other repositories considered within this thesis. It addressed the desire to move geographically constrained, offline, ad hoc, informal sharing of resources to a more visible, online system available to all tutors regardless of location.

The system which LORO was set up to replace was established to share print content, and relied upon tutors responding to direct requests for resources suitable for sharing with other ALs. The idea of sharing resources through the OU regional/national offices arose from the structure of the OU and its distributed teaching staff, the OU Associate Lecturers (ALs).

All OU ALs, receive copies of core resources created by the module team as the teaching basis for the course. These are the only resources which the tutor *requires* to teach the course, and as a distance teaching institution the resources are consistent and quality assured. These are resources which the AL needs to refer to in tutoring the course. The locally-shared resources represented additional or alternative course content which ALs may have created, initially for their own use. For example these could be resources such as holiday photos which the tutor has created or acquired, and may have used to tutor both OU and non-OU students.

LORO's role was extended shortly after the project start. It acquired an additional more formal responsibility within the OU Department of Languages, which decided to use LORO to make the core online teaching resources available to ALs through this repository. Resources which

tutors were *required* to access in order to undertake tutoring (i.e. core material), were to be distributed to ALs within LORO, the system devised to share optional resources non-formally. Core online resources had previously only been available via course websites using the OU VLE, Moodle. However, in the VLE, resources used in a course could only be accessed by tutors currently teaching that course. For example, ALs teaching French could not refer to resources used by German-teaching ALs unless they were also teaching German. They could not refer to resources used in French courses other than the one(s) they taught.

LORO could allow the department to share teaching resources with tutors, crossing level and language boundaries within the same faculty, as well as facilitating sharing from tutor to tutor(s). Course/Module boundaries within institutional VLEs are common in institutions beyond the OU. It has been noted that resources within institutional firewalls can be less visible to teachers within those institutions than OER published externally (Pegler, 2010a).

Introducing a repository, and fostering reuse, was noted in CS2-Stòr, as a possible stratagem to encourage and facilitate development of online practice. Introducing LORO coincided with a period when the OU Department of Languages was shifting to use of a new online teaching tool, Elluminate (an online audio conferencing system). LORO created an opportunity to share resources and ideas for teaching, including pre-populated Elluminate ‘whiteboards’ created for one tutor group which could be adapted by other ALs for their own tutor groups. Combining formal teaching resource dissemination and community sharing opportunities within LORO, instead of using this only for the originally-intended optional activity, ensured that all ALs needed to know how to access and use the system (i.e. upload, download, log in and search). Some level of expertise with the LORO system became necessary even for those ALs who chose not to share resources informally. Furthermore, LORO operated as both referatory (allowing users to upload links and information about these), as well a repository, allowing

upload of files. This permitted those ALs who wished to share resources beyond the OU community, or beyond LORO, to use public sites (e.g. SlideShare or YouTube) and paste links to these into LORO.

Prior to development of LORO, resources shared formally between ALs were not only routed through a third party, but also required to follow a specific template format. Although offline, this was centrally-controlled, as was the system used by L₂O (Figure 6.2). Under this restricted regional/national system of sharing, ALs were unable to share resources online across the Department of Languages. However, a parallel informal process existed based on 'just asking for things' (LORO A, 2009), i.e. direct tutor-to-tutor contact. On the basis of the 129 responses to the LORO environmental assessment at the start of the project, Tomás (2009, p14) noted that reactive sharing was the norm amongst ALs (88% reported sharing in response to a direct request for a resource). She also noted that 62% were sharing in response to a request at a 'personal and private level', suggesting that this was sharing with 'chosen colleagues', i.e. those they already knew, or knew of. LORO's final report for JISC noted that it had developed into 'a working repository used by 320+ tutors, 55 academics and 23 academic-related and support staff' (Comas-Quinn, 2010, p5). At that stage (July 2010) LORO contained nearly 1000 resources representing seven languages, and 300 hours of open educational resource. Comas-Quinn reported that LORO was 'fully embedded with the departmental procedures for course development and delivery; ... LORO has started a significant culture change in the way in which materials are sourced, produced and distributed or shared' (Comas-Quinn, 2010, p5).

6.2.4 L2O/LORO: Distinctive themes explored

As with the other cases in this chapter, distinctive themes from the case identified as relating to reuse or reuse facilitation are explored.

6.2.5 Shifting emphases in repository systems

Both L₂O and LORO were sharing resources connected with language teaching, so there was a strong disciplinary connection. An additional connection occurred through the development of the repository systems (Figure 6.1). Both CLARe and LORO used versions of the same technical system (EPrints <http://www.eprints.org/>), at different stages in its development. Despite the similarities the two projects took different approaches, each typical of its period. The L₂O project expected to create structured pedagogically-rich learning objects (and the assets within these), sourced from a variety of users, but presented in a standardised format, checked and uploaded by an expert central team (Figure 6.2). The L₂O project staff acted as gatekeepers within a relatively formal process. They ensured quality assurance of metadata and resources and facilitated a consistent design approach. This approach overcame the relative inexperience in designing for elearning amongst teaching staff at this time. It is likely that many of the resources submitted for reuse would have been originally created as offline resources.

The amount of metadata that was required in the early stages of the L₂O project reflected the emphasis placed on metadata within the mesoenvironment (Section 3.5). L₂O A comments:

we started out with lengthy metadata sheets where a large amount of the metadata was technical and we modified these countless times through putting them in front of our partners and the outcome was that the amount of metadata was way too much and completely off-putting for anyone wanting to share anything because you spent more time filling in the metadata forms than anything else. (L₂O A, 2009)

She contrasted that with the newer systems (which the later project, LORO, adopted from the start):

it's just a small set of key words the kind of resource type, and so on. The information is evident elsewhere so you don't need to fill it in on the form, you can see it when you

look at the file, so we have come back to a very simple set of metadata a simple description of three or four lines'. (L₂O A, 2009)

The emphasis within the Language Box and HUMBOX (and thus LORO) systems was on making it easy to preview the resource, so that potential users could make a quicker review than previously possible within a repository. The desirability of quicker review mechanisms was identified in CS2-Stòr.

Language Box, HUMBOX and LORO also provided the facility for users to create and publish profiles. Further reflecting Web 2.0 approaches to sharing online, these later repositories, offered a system to allow users to supply information about the resource, noting comments, feedback and ideas. Such additional information could be regarded as a form of secondary metadata (Section 3.5.1). However, as LORO A (2009) pointed out: 'there has to be a critical mass reached in terms of usage of the repository, in visiting the repository and being there enough to add in their comments while they are there, because people are not just going to go back and add a comment because the project asked them to'.

LORO A suggested that the repository could raise a lecturer's profile and showcase their work. She pointed out that the system recorded how many downloads your resources had attracted, suggesting that in the future: 'this is going to be something that is used when you do your appraisal, and you can say, "Hey, look at my teaching"' (LORO A, 2009), making comparison with how the OU's institutional research repository, Open Research Online (ORO), was used. Both L₂O A and LORO A saw the potential for an online community to emerge and develop centred on a repository, however there were differences in how the community was to communicate. In LORO this was to occur directly through the repository, without mediation, with emphasis on informal dialogue around the resources. Contextualised metadata was being

provided through conversations around learning resources, but in a far less controlled way than anticipated in the L₂O model.

The enthusiasm of the two interviewees, both members of project teams providing a repository service, may not accurately reflect other users of the service. The LORO Interim Report (Tomás, 2009) noted concerns amongst ALs about using such a service. In research conducted prior to engaging with LORO, two of the top three reasons given for not using a repository were concerns about control of the content. Comments recorded included fears about: 'People appropriating my stuff without acknowledgement' and 'People misusing my stuff, e.g. adapting inappropriately' (Tomás, 2009, p11). These reservations about other repository users highlighted the shift from relatively tight controls on repository use to placing greater trust in users. There has been a significant shift from centrally managed resources to users loading their own resources, and from a restricted user base (L₂O) towards sharing educational resources with open licenses (LORO). Both shifts, to user-generated content shared relatively informally and to openness, reflect wider meso- and macroenvironmental trends.

6.2.6 Resource reuse within large courses and a common curriculum

As already noted, several of the cases (CS1-H806, CS3-LORO, CS4-SORRS and CS5-PROWE) occurred at the OU, either wholly based there, or in conjunction with another HEI. While the selection of cases was to some extent informed by access to the projects (the researcher worked at the OU), prominence of this institution also reflects its scale and its commitment to developing online resources for large-population courses.

The initial opportunity, described as the 'spark' which initiated LORO was associated with the scale of teaching at the OU:

We had such large populations of tutors tutoring exactly the same course. They would all be preparing materials, when they could just have a look at what other people were doing. (LORO A, 2009)

Although the Department of Languages (DoL) which initiated LORO is one of the smaller of the OU's departments, it nonetheless represents a large teaching community compared with other HEIs. By Autumn 2009, at the time LORO A was interviewed, the repository covered 12 OU courses and served c.350 tutors. Within distance teaching a large number of tutors not only teach the same module, but also support study of the same set of activities while working to a common course schedule.

CS2-Stòr had also set up a repository which, although supporting teachers within the same discipline, invested energy in developing a taxonomy to ensure clear identification of content appropriate to educators across the nine institutions. Although that repository was national, the number of teachers was smaller than the OU teachers involved in the LORO *departmental* repository. LORO felt no need to develop a taxonomy to describe content as its OU users were already familiar with the OU alphanumeric module coding system. T186 and H850 were course codes mentioned in CS1-H806. These codes communicate information about which faculty/ies created the module (i.e. H = IET) and whether this was undergraduate or postgraduate level (i.e. numbers starting with 8 = postgraduate) and, if the former, which level (i.e. numbers starting with 1 = first level undergraduate). Once a course code is known, the connection between courses also becomes apparent. For example, AA100 is an Arts Foundation level course and from the same *family* of courses as A100, A101 and A102.

Within OU courses there is further standardisation. Courses will usually be divided into units studied according to the course schedule, with activities occurring within specific weekly time

slots. Students, tutors and central course teams work to the same calendar of events. LORO tutors would know which activities fellow ALs were engaged with during a specific week and which topics would follow. Although working independently, without requirement to maintain contact with other tutors, OU ALs are aware that they teach the same course topics, using the same core resources, to the same schedule as other course tutors. This has effect on the timeliness of requests for, or offers of, online help in addressing a topic (e.g. a request for an alternative resource). These appeals/offers are likely to occur when others were actively engaged in the same teaching activity. Time is an important consideration when the sharers of resources are part-time staff, not paid to help their peers. Relevant resources to share were more likely to be currently in use, rather than located in an archive. This attribute of large-scale distance teaching creates opportunities to offer reusable resources reactively at times when others are likely to find them most useful.

This is how LORO A saw this system as working:

Well we've made the point of including in the metadata the course information ... the number of the course, the course code. That gives you immediately the language and the level. And then you can select which unit within that course that resource belongs to. So what I envisage will happen is that tutors who are in Month 5 of the course, Unit 4, they will say "Let's go into the repository and see what there is for Unit 4" when they're preparing their tutorial for Unit 4. (LORO A, 2009)

When she observed that 'I just wanted a great big box that was searchable, you know that we could dump things in, but could find them again. That was it and everything else was just too complicated' she was emphasising her aspiration for a technically simple system, without requirement for extensive metadata. This contrasts with the systems that preceded Language Box (including CLARe). However, finding things in the OU's 'big box' did not pose the same

challenge as finding things when the users and courses were more diverse and there were no common coding, course structures or calendars existed.

Sharing any resource is more efficient where users with similar needs can be reached through a single channel. This was the case with LORO. Not only the creators, but also the users of the resources occupied the same proximity zone (discussed further in Section 7.3.2) and used the same online system. While initially the system use was optional, when it shifted to being required (i.e. in order to access core teaching resources) the LORO team could be confident that all tutors would be able to use the technology and would visit the repository at least for the purpose of downloading core content.

This raises questions about how far the sharing practices within distance learning institutions with large scale courses/modules, such as the OU, can be compared with those of other institutions. This question is revisited in Chapter 7 after consideration of other OU-based cases (CS4-SORRS and CS5-PROWE).

6.2.7 Shifting motivations for sharing

Asked why individual academics (ALs) might wish to share their resources in a repository LORO A suggested that this may be motivated by pride in particularly good work: ‘you know if you’ve done something that’s worked really well you might be quite proud of it and say: “Well look, this is the material I used it worked really well”’ (LORO A, 2009). However, having also stressed the value of sharing with new staff, perhaps as a mentor, she underlines that she would like sharing to be not only about offering ‘best pieces’. She sees the value of sharing work that ‘somebody else might just look at it and say that such a great idea and knock up a completely

new resource' (LORO A, 2009), identifying the sharing of ideas, learning designs and influences as well as sharing something which is suitable for reuse *as is* (i.e. unmodified).

This lecturer was identifying two different types of sharing. In one type, which she saw as desire to 'showcase' good work, resources were of high quality and reuse could be anticipated with few or no changes. This was the 'classic' model which earlier repositories, e.g. CS2-Stòr promoted. The other type of sharing that she identified was closer to the motivation for sharing open source code. It suggested a preparedness to allow others to adapt and develop the resource in order to *improve* it. This activity could be associated with sharing of resources under an open license as OER and permitting modification. If the resource was to be shared for repurposing, or as a source of ideas, then it need not be so polished. LORO A (2009), in expressing this aspiration may have been atypical of other LORO users. Reservations about relinquishing control over onward use of the resources shared, has already been mentioned: 'People misusing my stuff, e.g. adapting inappropriately' (Tomás, 2009, p11). LORO A may be assuming that these concerns would be addressed as LORO developed and users became accustomed to it.

LORO A was also identifying the value of sharing resources as part of an open practice (Conole, 2010b), emphasising the relevance for language teachers of sharing process rather than focusing only on sharing content:

Beginners' materials for language teaching are very, very similar. There is only so many ways of practicing telling the time, so what's the point of the Welsh team having to create from scratch a whole host of materials when they could just take the French or the German or the Spanish and slightly adapt it. (LORO A, 2009).

Later in the interview she reinforced this idea of looking for ideas rather than content, associating this with language teaching as a discipline: 'the way we are [language teachers] nothing is ever perfect so I see that probably that will be a very, very small minority of, you know, [reuse] ... with activities it could be very difficult to find exactly, exactly what you're looking for' (LORO, 2009). This suggests that although creators may be motivated to share under a classic showcase model, their resources are likely to be subject to modification by others rather than used 'as is'. LORO A is suggesting that new types of sharing may emerge as communities using repositories become more confident and embedded.

The L₂O and LORO projects were both based on facilitation of sharing of *existing resources*, for reuse, adaptation or as a source of idea. The L₂O project, although having an existing stock of learning objects to draw on, was involved in creating new versions and some new content as part of its project. While LORO was focused on sharing what already existed without modification the less 'finished' work that LORO A refers to as useful to reuse would not have been acceptable within the L₂O system, or in the CS2-Stòr project. Their requirements for formal metadata and quality checks would have further discouraged deposit by part-time staff, because of the additional time investment required. The simpler-to-use LORO system offered an informal, user-controlled deposit process which reduced substantially the time required to publish shareable resources. It allowed for fast responsive sharing, consistent with the previous practice of sharing by email. In three years, ideas of what repositories were for had shifted noticeably. Both L₂O and LORO operated within the Languages subject area and have strong familial connections to each other, with LORO being described as the 'grand-daughter' of L₂O (LORO A, 2009). However, LORO was seen as a source for educators to draw on as well as a source of finished resources. This allowed it to embrace a more relaxed approach and anticipate productive sharing and repurposing of a range of resources types and qualities. L₂O

assumed that educators drawing from its repository would need a finished product, consistent in its design and ready to place in front of learners.

6.2.8 Case Study 3: Other factors

Three distinctive themes were identified above as relevant to interpretation of the two projects presented within this case. Other factors recorded on the basis of researching these two projects were logged as with previous cases as a list within Insert 7.1 and are referred to in the cross-case comparison in Chapter 7.

6.2.9 Case Study 3: Conclusions

Although similar in scope and initial funding source, L₂O and LORO took markedly different approaches to sharing and exhibited different expectations of reuse with respect to sharing and use practice. Only four years separated the start-up of these two projects, yet LORO was building on the third generation of repository derived from L₂O (see Figure 6.1). During a relatively short period there had been shifts within the mesoenvironment away from emphasis on formal metadata (Section 3.5), and towards acceptance of user-generated resources. Both shifts reflected a wider engagement within UK HE in adopting Web 2.0 approaches such as user profiles, feeds, commenting, and web analytics. These could provide contextual ‘metadata’ about the resources automatically and less formally. LORO, in its objectives, also reflected the growing interest in OER. At the time of the interview with LORO A in Autumn 2009 the LORO repository was moving forward with that approach, with a combination of open and restricted access resources within its repository. Together the projects illustrate how the speed of change in the meso- and macroenvironments affected the approaches that repositories and reuse facilitation could now adopt.

Both projects were not simply *projects*, but also committed to developing a service within the context of a disciplinary community. There is evidence that they achieved both objectives and sustained progress. LORO, after external funding ended in 2010, continued in operation and remains open in 2012. In Spring 2011, following the HEA decision to no longer support the Subject Centre Network, the HUMBOX and Language Box repositories, with their connection to the LLAS Subject Centre, were under threat. Announcements quickly appeared on the HUMBOX and Language Box websites noting that these would 'continue to be developed and managed by University of Southampton, School of Humanities/School of Electronics and Computer Science, with no disruption of service at all' (HUMBOX, 2011, Language Box, 2011). The work to which these projects contributed and from which it benefited was being maintained and 'developed' by a HEI on behalf of the disciplinary community.

This was an important reassurance, and a significant example of a HEI taking operational responsibility for a service which had previously relied on external project funding. As noted in CS5-PROWE, where a repository service has an insecure future, users may be deterred from investing time in learning how to use it and expending effort in uploading resources and adopting it within their normal teaching practice. The success of the CS3 initiatives in attracting continued support from their host institutions for their latest repositories suggests that, even in times of budgetary constraint, these are recognised as successful and of value.

CS3 also provides information about discipline-based repositories. The set of six cases within this research, include two different disciplinary repository initiatives, with two examples offered for each (CS2-Stòr and CS4-SORRS, both addressing Social Work/Social Care teaching). The needs of users and their expectations of the service provided may be shaped by the discipline. For example, a need for authoritative and up-to-date legal and policy advice is not a feature of language teaching, although this was a priority for CS4-SORRS. This affects the

potential for acceptance of user-generated resources. For example, LORO has held photography competitions to encourage deposit of users' photographs to support language teaching. These relatively granular learning resources (what L₂O described as pedagogical assets) are used extensively in language teaching, and can support a type of repurposing that arises from selection of customised sets and integration with existing resources within a familiar learning design.

6.3 Context of Case Study 4: SORRS

SORRS (the Shared Online Resources Repository System) was a project set up in late 2004 to develop a departmental repository for use by the OU's School of Health and Social Welfare (SHSW), now the Faculty of Health and Social Care (HSC). This project informed the development of the HSC Resource Bank which went live to students in January 2008. Relatively strict criteria were laid down about the type and behaviour of the resources within SORRS. For example, they were to be 'self-contained' and in terms of granularity were to be 'the smallest possible unit of content, subject only to the need for it to be self-contained' (Hall, 2006). These criteria are similar to those commonly established for learning objects (e.g. Longmire (2000), Wiley, *et al.*, (2003)) so they fall within the stricter Category 1 classification (Figure 3.1). However, shortly after the start of the project the term 'learning objects' was dropped as a description of the contents of the Resource Bank.

By September 2008 the repository content included resources specifically commissioned for the repository (e.g. the Milestones resource), and versions of resources created as part of a specific course (e.g. the new Palliative Care study pathway created for K260 *Death and Dying*). The repository also referred users, via links, to non-OU resources, including SIESWE resources such as those noted in CS2-Stòr. The Bank resources and links could be accessed by registered HSC students, HSC and other OU staff working on HSC courses, including associate lecturers (ALs), tutoring HSC courses. This repository was unusual within the set of case studies in being one where the students were intended to use and navigate a repository directly. They would, through this system, be able to view resources required for their course of study, and also search others used by other courses.

SORRS D, HSC Associate Dean and one of the longest serving members of staff in this faculty identified three reasons why he had initiated the SORRS project:

1. [to] avoid course teams recreating material that was actually, it became clear, quite commonly used across different Health and Social Care courses (SORRS D, 2009).
2. [HSC] had a lot of resource material that students needed to draw on around policy and the law and care systems that needed to be nation-specific. So if a student was studying in Scotland, we wanted a slicker way of presenting to them the background resource material that they needed to draw on. (SORRS D, 2009)
3. [HSC] wanted to be in a position to update policy type material as soon as changes happened, so that a student might be in the middle of a course when an important change happened at governmental level and ideally we'd like the material to reflect that change. (SORRS D, 2009)

SORRS D considered the activity referred to in 1 (i.e. versioning and repurposing) as 'bespoke' activity and commented: 'I think we've got very used to the idea that a high quality course is one that is bespoke and doesn't reuse. I think we've now changed that debate.' (SORRS D, 2009).

In 2 and 3 SORRS D was identifying specific aims of the repository that reflected needs within his department. Social Care and Health are subjects which can be subject to sudden change, in law or in the processes controlling their profession. Students would need to be aware of the current advice and legal requirements. A central repository would allow changes to be made on one place, which would update all courses using the resource. A more unusual driver for the Bank was 2. This refers to course delivery challenges arising from the devolution of Scotland, Wales and Northern Ireland, which had resulted in different practice and law relating

to social work across the four nations within the UK. Students within the same course needed to refer to nation-specific resources in their studies. HSC had previously supplied students with large printed reference resources subdivided by nation, a practice perceived as not only wasteful, but daunting for students, who received 'these great tomes' (SORRS D, 2009).

SORRS A and SORRS D, had been working in HSC longer than other interviewees, and had leadership roles on the SORRS steering group. Both suggested that once the repository was established the resources could be used in more innovative ways. SORRS A, as author of the Law Cards, a resource used across seven HSC courses, hoped that users would not only link to the resource but structure engagement around it. SORRS D identified (in similar fashion to CS2-Stòr, CS3-LORO), an underlying aspiration to improve engagement with online learning. He saw this wider use as following from and dependant on development of the repository in a technically user-friendly form:

the critical thing is to get much more interesting pedagogical use. Rather than just students being pointed to or finding from a list particular bits of information that they need, what I want to do is get some real exemplars of teaching through case material where students would then explore. Almost like problem based learning, students would explore the resources that appear to relate and then get some commentary back on what they've chosen to access. And so it becomes much more of a learning process. (SORRS D, 2009)

A further objective in establishing SORRS was to support continuing professional development (CPD) activity. OU HSC graduates working in health or social care require regular CPD to maintain their professional accreditation. They could benefit from the updated resources described in 3 above.

Compared to the other cases, the objectives of SORRS were highly specific and two were clearly mapped to the faculty's current needs, with only one 'aspirational' objective. This was a heavily 'contextualised' repository initiative identifying and obtaining resources which it would itself reuse. The repository was expected to increase faculty efficiency, providing a user-friendly approach to storing and retrieving course resources. The project was initiated and funded at a faculty level, so the drivers for specification of the repository were different from those of other externally funded cases reliant on short term project funding. While this may have suggested more flexibility to alter the specification of SORRS and the Bank, because it was tied to existing courses and actual rather than assumed technical systems, any flexibility was reduced.

6.3.1 SORRS: Distinctive themes explored

The SORRS project is the only case in this thesis which sits wholly within the OU in having users limited to OU students and staff working within OU systems, without external partners. As noted in CS1-H806 and CS3-LORO there are differences between course production and teaching approaches between large-scale distance education and campus-based HEIs. This affects the opportunities for reuse and repurposing resources within the institution and is further discussed in Section 7.3.1. It is likely that funding *development* of a departmental repository would not be feasible outside the OU. This case nonetheless offers insight into the challenges of setting up a focused repository service, to address specific deliverables within an on-going service. Other HEIs would face similar challenges when trying to integrate a bought-in or open source repository system.

The distinctive factors focused on in this case centre on how to integrate a new system for sharing and reusing resources into existing technical systems and course creation activity in a

formal, rather than non-formal, informal or optional, way. Although CS3-LORO became integrated into formal systems this was not initially part of its remit and emerged after the repository system had been set up. For CS4-SORRS integration at a formal level was the objective from the start.

6.3.2 Integrating the HSC resource bank with institutional systems

One of the significant themes for this case was the effect of engagement with other technical systems and resource creation activities within the institution. This was a particularly acute problem as the timing of the project occurred in parallel with introduction of the first institution-wide VLE at the OU. The VLE was one of several key technical systems in development over this period. Shifts towards online learning and changes in systems supporting this activity are also on-going and familiar themes within other UK HEIs.

At the OU there were changes not only in systems, but also in processes. For example, the proposed introduction of structured formatting and tagging of course content (structured authoring), anticipated throughout the SORRS project stage, would allow OU-generated course content to be available consistently and effectively in different formats for different audiences (di Paulo, 2006). This was particularly relevant to the customisation of content necessitated by devolution, which SORRS was set up to address (Section 6.3). Although SORRS was a *project*, like CS2-Stòr it was focused on providing a service to support HSC activity on an on-going basis. It was required to integrate with other OU systems (existing and planned), and provide direct student access to core resources, while also allowing them search more widely. While most reuse *projects* may have shorter term goals and less technical constraints, in order to become established within institutional operations they will need to address similar challenges.

In 2004, at the time that the SORRS project started, while the OU did not have an institutional VLE, it already had several university-wide, centrally-operated systems for storing educational resources. These were bespoke systems, the scale of which reflected the complexity of the OU's publishing activity. However, these systems were not intended for AL or student access and not usually accessed by academics. These were live systems used to support course production. One objective for the new HSC repository was to work seamlessly with the OU Moodle VLE, then in an early stage of development. Discussions, over this period, about development of a new OU-wide Enterprise Content Management System (ECMS) generated uncertainty about how the SORRS repository should operate and whether it would be necessary. All faculties would be required to use that central system. However, as with the existing OU document delivery systems, it was later confirmed that the new ECMS would be inaccessible to ALs and students, so not suited to SORRS's purposes.

The technical discussions about integration of the SORRS system with others at university-level required negotiation at every stage of development and was regarded by the project team as a large part of the reason why the repository took so long to launch. There were knock-on effects from delays, rescheduling and cancellation of those other projects. The SORRS team devoted time to research and propose interfaces with systems, which was later found to be inappropriate or unnecessary effort as plans for these changed. While this work may generally prove useful it suggests that there may be unanticipated costs in developing intra-institutional interfaces of an intra-institutional repository.

As the repository system was also to be used by students, it needed to interoperate effectively with the proposed new VLE. However, it was initially not known what the new OU VLE would look like, or how it would be implemented. This created design problems similar to those noted in CS1-H806 where there was uncertainty about the UKeU platform (Section 5.2.1.2).

Unlike that case, the SORRS team were addressing this challenge on behalf of many courses rather than one. They also had faculty objectives to address which informed their requirements in terms of the student interface design (e.g. customisation related to devolution).

SORRS D reflected on the impact this had on the system developed:

If anything we have become rather less ambitious because of being somewhat ground down by technical problems. ... We'd have loved it to be a state of the art website that was smooth to navigate through and also visually more appealing. On both of those scores I think it has been disappointing ... most of what we set out to do is possible [for users], it's just not as appealing as a system as I think we'd all hoped it would be. (SORRS D, 2009)

As in CS1-H806, the SORRS team had no direct influence over university-wide technical developments, although it necessarily planned its repository's functionality around them. As an on-going service dependence on the success of parallel technical developments will continue to be an issue when maintaining and further developing the repository.

6.3.3 Reuse of resources that are generic and single version

HSC aimed to create a bank of resources suited to students from a range of courses and to create a single point for updating resources shared over several courses. To achieve this, it was necessary for each resource to be available as a single version. This meant that resources created for specific courses would require de-contextualisation, to be used across others.

Using the terms employed by the project team, the resources needed to be created or remade as *generic* resources. SORRS C explained this as: 'by generic I just mean that it's not very course specific. ... we don't want course numbers mentioned or course titles or referring to other bits

of the course' (SORRS C, 2009). This was recognised as requiring a change to the normal approach to writing material for student use: 'It has to be written as a stand-alone generic item and not just as part of their ordinary course unit, or whatever they are writing' (SORRS C, 2009). This stand-alone approach to writing can be linked to discussions about learning object characteristics within the mesoenvironment of reuse (e.g. Longmire, 2000). As CS1-H806 showed, writing to avoid course-context references was possible and part of RLO creation, although this was not normal OU practice. However, within the microenvironment of CS4-SORRS, the term 'learning object' was avoided as it was believed that this would suggest unwelcome restrictions on writing and prove off-putting to potential contributors.

SORRS C suggested that not only those donating resources, but those using the Bank could be put off by the RLO label. She saw a clear distinction between the resources in the Bank and learning objects. Resources in the Bank were more like reference resources:

people [academics] don't like to use it [the learning object] because it's not teaching the stuff in the way that they want to teach it. Whereas the Bank is completely different from that. You can teach however you like. It doesn't stop you teaching however you like. You just basically draw on, or get the student to draw on this information. (SORRS C, 2009)

Her description of Bank resources emphasises the dominance of reference and information material: 'Most of the stuff we have, apart from the skills activities, is reference material. So it's very factual, it's there for students to draw on as a resource. ... it's background material in most cases, it's relevant to lots of different courses' (SORRS C, 2009).

This is significant as one of the requirements set up by SORRS project was that the reusable contents would not to be further revised by users. Reuse would be use 'as is' rather than

through repurposing. This restriction aimed to avoid multiple versions of the same resource being used within the same faculty. It underlines the first of the expectations that gave rise to development of the Bank (Section 6.3.1).

The first resources identified as shareable within a HSC departmental repository, and included in the Bank were the HSC Law Cards. This was a set of reference resources which would be used by at least six of the courses planned for 2007 and were perceived to have potential as CPD resources. The Care Systems instructions and the Aids to Practice cards (also proposed for use across two courses in production during 2007) were also reference-like material. The only resources which could be said to resemble learning objects, with learning objectives and activities, were the ICT and information literacy skills resources. These covered technical skills rather than disciplinary skill, such as 'Using a Search Engine', 'Creating Study Record cards', and 'Producing a list of references using RefWorks'.

If Bank resources were to be 'generic', not open to versioning and not expected to influence teaching approaches, then they were closer perhaps to reference resources than to teaching resources not only in form, but also in use. SORRS C makes the point that for a resource to be put into the Resource Bank, 'the key thing is it has to be usable by more than one course' (SORRS C, 2009). This qualification would deter deposit of resources which simply *anticipated* reuse. It was a logical constraint as there were direct costs involved in preparing resources for the repository (Section 6.3.4), however it assumed that reuse of specific resources could be accurately anticipated.

It is unlikely that HSC could justify a high level of support to prepare resources for deposit without evidence of *prima facie* reuse potential. However this restriction limited the type of resources deposited, with further emphasis on reusable reference material and generic skills

support resources. There was little potential within this arrangement for serendipitous reuse, such as that displayed in CS1-H806, where resources were reused outside their original context and expected application.

SORRS B, the chair of K217 (Adult Health, Social Care and Wellbeing) was mentioned by other SORRS interviewees as someone whose course had demonstrated reuse. He had previously worked on the CURVE project (2001-2003) so was familiar with strategies such as preversioning. There were indications that he applied this familiarity with reuse to work in HSC. For example, four of the six course blocks are produced as what he called 'generic' material – i.e. common to the course in all its customised forms and written for use in more than one teaching context. He also reused resources from a variety of sources, enthusiastically describing an experience within HSC when the course team, working to a time timescale rapidly assembled reusable resources while working to tight deadlines:

Some of these were existing course materials that were reworked, some of these were the resources from the Resource Bank that were going to be plugged in ... some of them were journal articles, some of them were policy documents, some of them were educational websites from other places. There was one on a tour of a prison, I seem to remember. So, a variety of things. Luck, happenstance and searching, I think. (SORRS B, 2009)

Unlike some of these external resources, those in the Resource Bank could not be versioned. SORRS B pointed out that the Bank allowed little freedom to use parts of resources: 'I can't look at a resource and say, "Well I want this and I don't want that." I have to accept the whole thing or nothing at all.' (SORRS B, 2009)

SORRS B, like SORRS C, was familiar with the rationale for reusing resources, and voiced reservations about the constraints which a standardised set of resources may impose and the positive and negative aspects of operating within those constraints:

The SORRS resource is obviously a locked object, these are locked objects, we can't do anything to change those, and it has caused some of the difficulties as people have said, "Can't we change this?" ... "Can't we make it shorter," typically. And the skill in reusing the SORRS objects is that we have to write an activity around them that sometimes twists the contours of the topic, sometimes in quite interesting and surprising ways, and sometimes in ways that I worry are silly. (SORRS B, 2009)

Brosnan (2006) researching learning object reuse in UK HEIs, suggested that recontextualisation is a complex activity for staff involved in resource reuse. What is interesting in CS4-SORRS is that re-contextualisation was seen as a desirable, at least in some minor repurposing, even though the resources were drawn from, or selected by, staff within the same faculty and specifically prepared for reuse within that faculty.

6.3.4 Repository support and assumptions of resource maintenance

The amount and type of support required by HSC staff to deposit resources surprised project staff. It was initially assumed that authors should input their own metadata, selected from a list of 30 keyword topics with associated synonyms. Metadata was to be input using a simple web-based form. This approach proved unsuccessful because of inaccuracies in the metadata and descriptions supplied. As one member of the team recalled:

it was such a mess. It created so much work for the course team to go back and check it, and correct it, and put the right things in [it], that this year we have given up on that. Basically the SORRS team... will enter the metadata. ... it's just easier to do it that way and make sure it gets put in correctly and it all matches up than to go back and make

changes, you know, correct the mistakes that people do. So it's all done by the team now. (SORRS C, 2009)

The new approach involved the project team in collecting the necessary information, checking this against the resource and other sources, and *then* entering the metadata. The HSC Resource Bank is unusual in having a support team that it can use in this way. Its experiences with user-generated metadata were, however, not unusual (e.g. Currier, 2004a).

One reason suggested for providing additional assistance was the difficulty in using the online database within which metadata was at that time stored. This made correction of metadata mistakes user-unfriendly but would in future be addressed. However, as examples of incorrect metadata entry included inaccurate record of the resource title, information supply may be an on-going problem regardless of the technical user-friendliness of the metadata system. It was not clear why the contributors of the resource are unable to record basic information consistently and accurately, although it suggests that resource creators did not give accuracy of metadata high priority.

Inaccurate metadata is a greater problem where relatively inexpert users (e.g. students), with low experience of the repository and its contents, are searching for suitable resources. Given the small scale of the repository, had the use been restricted to academics or ALs connected with HSC, inaccuracy of the metadata may have been overcome by a relatively high familiarity generated by on-going use of the resources within the system.

SORRS C also identified an assumption by some academics that the Resource Bank would take responsibility for updating the resource on an on-going basis. She suggested that authors took the view that: "Well OK I'm writing this for the Bank and that's great for me because I won't

then have to update it''' (SORRS C). SORRS D also noted this assumption that the repository would take on-going responsibility for resources it requested. He suggested what the reasoning underlying this was: 'less about fierce ownership [of the resource] than protecting themselves from an on-going responsibility' (SORRS D, 2009). This assumption contrasts with the on-going responsibility of authors of resources produced as part of normal course creation activity. It suggests that they saw deposit into the Bank as an additional requirement, perhaps because this was a new version, not part and parcel of their usual course activity.

It is difficult to see how the Resource Bank team could support resource updating, as this would require subject-specific knowledge. However, as the project placed emphasis on reference-style resources, academics may see the resources that they contribute as static. The process could more closely resemble preparing deposit of a research or information publication than creating part of a live course with a regular review cycle. Content creators may also interpret the availability of project support staff, who assist in inputting metadata, as part of a service which could extend to identifying and replacing broken links. This contrasts with the later OU faculty-based repository, CS3-LORO, where there was a lower level of central control over resource deposit and lower level of central control over deposited resources.

6.3.5 Case Study 4: Other factors

Three distinctive themes were identified as relevant to interpretation of the SORRS project based on analysis of a wider range of factors identified regarding this case. These factors have been logged as with previous cases as a list (see Insert 7.1).

6.3.6 Case Study 4: Conclusions

This case sought to facilitate sharing within a community where the institutional and disciplinary context was familiar to all users. Beyond that, SORRS had specific project objectives, e.g. to address customisation as a response to devolution, and a broader remit to change practice. This last was common across all other cases except CS1-H806 (a course). At the time of the interviews (July 2009), the Bank was just becoming established. It had been in operation since 2008 but had yet to make an impact within the faculty, with sharing and reuse still actively initiated by the project team. SORRS A noted that within what he described as ‘the autonomous course team’ reuse (i.e. the course creators operating normally), the Bank was still not foremost in authors’ minds. He associated this with wider changes:

So it’s about changing approaches to how people, what people see as being what course teams do, and slowly trying to break down the idea that course teams have to do everything, that everything is bespoke. [Pause] I think we are in a period of quite significant transition in terms of what the role, in course production terms, what the role of the academic is in the OU (SORRS A, 2009).

The HSC Resource Bank was only one of a range of adjustments HSC academics are required to make: ‘they are still only just getting to grips with using online resources, things like websites and journal articles and so on, and that’s still very new. So the Bank as yet is just yet another complication’ (SORRS C, 2009). This would be similar to the challenges facing other faculties within and beyond the OU. Technically-mediated reuse throughout the research period has represented further change which educators are encouraged to make in already fast-changing practice. This may be why, although the SORRS team had been building awareness of the project since 2004, HSC staff still required prompting about the need to place or reuse a resource in the Bank: ‘people are still not, if you like, Resource Bank conscious, they need those constant reminders and support in using materials from the Bank’ (SORRS C, 2009).

Illustrating the on-going nature of the tensions relating to integration with institutional technical systems, at the time of the interviews the Bank team were awaiting further changes to OU systems. This had resulted in a further pause before soliciting new content for the Bank.

Despite these difficulties, SORRS C stressed what she saw as the long term benefits, identifying time saving as an attractive gain for users. SORRS C pointed out that 'The more [that] people write stuff for the Bank the less you will have to do for yourself, because there will be more stuff in the Bank that you can use in future courses' (SORRS C, 2009). HSC was a very busy faculty, one of the smallest at the OU, but also one of the fastest growing. Saving time should have strong appeal; however the uncertainty of future time saving for the individual sharing resources, while requiring additional time investment in the present, may make this benefit less directly appealing to busy educators. There was no certainty that the people contributing to the Bank, would be those who would reap benefits of reuse, unless planning to reuse their own content. Institutional processes meant that even if creators were to save time as a result of sharing, this benefit may relate to a different course budget or financial period, and not that in which the effort was expended. As SORRS C acknowledges, 'It's usually difficult to think beyond the end of the course' (SORRS C, 2009). This is a dilemma for time-pressured academics and suggests that the time required to share resources needs to be as small as possible as any time saving anticipated though use may be perceived as unpredictable.

The time balance dilemma (i.e. current effort in expectation of future benefit) is more complex than simply saving time in the future by depositing now if there is also responsibility for on-going resource maintenance (Section 6.3.4). There is an issue of who pays for time spent on maintenance (i.e. which budget or year). The question of who is responsible for maintaining a resource is one which affects all repositories and has implications for the quality of resources which may degrade over time without active maintenance.

Just as CS2-Stòr allowed users to blend repository resources with others, SORRS B, included other ‘found items’ in his reuse activity, recognising the range of free online resources available beyond the OU. He suggests that there may be digital literacy benefits for students in using resources from public sources:

I think educationally I’ve advocated it on the basis of people’s attention is going to be directed to the world outside, to the BBC, to YouTube, and we want them to be able to get an angle on these things, to understand the things they encounter, to look at them more critically or deeper. So I think it’s a very good thing to do. (SORRS B, 2009).

This approach appeared unacceptable to some colleagues who suggested to him that students ‘don’t want a course that looks like a scrap yard challenge, no, they want stuff that is proper’ (SORRS B, 2009). That concern resonates with broader questions about reuse. For example, OER commentators are trying to establish viable business models consistent with reuse of openly available resources with students paying a fee for university teaching (e.g. Aczel, *et al.*, 2011).

The Resource Bank was set up to provide a protected repository and was the most restrictive of all the cases researched in terms of the type of resource that could be deposited. This level of protection was associated with the requirement that students could use the repository directly and also search it. While this dual-aspect (educator and student) orientation represented the most efficient way of ensuring that there was a single point at which resources could be updated, it introduced additional challenges in requiring student-friendly integration of the repository with the VLE. Questions arose about what protection the student required from exposure to different versions and inconsistent levels of quality. Further questions about whether students require decontextualised resources, or generic versions, were central to this project and reuse.

Within the fields of Social Work and Health it was particularly important that the information on legal issues and policy should be up-to-date and accurate. This disciplinary emphasis placed an additional constraint on the type of resources held and how they could be reused. In contrast to CS3-LORO, this was a repository where the faculty, rather than individual users, identified, controlled and directly supported resource deposit. Only those resources which were generic, described formally with metadata and up-to-date would be uploaded to the repository.

What this case principally offers is an insight into the challenges of creating intra-institutional repositories as on-going services linked with performance objectives and student use. While the project aims were specific and well-articulated, the problems realising these within real-life teaching and learning practice suggest that establishing a formal repository is a more challenging task than other projects suggest, particularly where a high degree of centralised control is required.

6.4 Context of Case Study 5: PROWE

This case concerns a two-year project within the JISC-funded Digital Repositories programme which ran from June 2005 to July 2007. Evaluation led by the researcher occurred primarily within the second year. PROWE addressed the idea of personal and informal repositories, one of the less popular strands within a JISC-funded programme which was otherwise focused on formal repository and reuse activity (JISC, 2005). The original acronym used to describe PROWE was PROBE (Personal Repositories Online: Bliki environments) and the focus of the project was on exploring the potential of blogs and wikis, to meet the personal repository needs of tutors teaching distance learning (DL) courses at the Open University and the University of Leicester (UoL).

The OU was the largest, and UoL second largest, distance teaching HEI in the UK. In 2005, the OU had an estimated 180,000 distance taught students and more than 7,000 associate lecturers (part-time tutors). The UoL had c.6000 distance learners (DL) students (Churchill and Dence, 2006) and c.350 tutors (Dence, 2006) although as a mixed-mode institution its teaching emphasis was on campus-based face-to-face activity. Each of the eleven UoL faculties known to offer DL appointed tutors to faculty-specific roles. These ranged from substantive teaching of a course to simply marking student assignments. There was no centralised provision for staff development support of UoL DL tutors (Dence and Hewling, 2006).

In contrast, the OU tutors were regionally managed but appointed to university-wide standard AL contracts, with many working across more than one faculty. Unlike the UoL tutors they had access to an OU-wide online tutor community, including forums and special interest groups developed for and by ALs.

Many UK HEIs engage in distance learning activity and employ part-time staff to teach and assess these courses and provide student support, often on fixed term contracts. These staff may undertake their teaching activity at physical distance not only from their students, but from each other and from the faculty for which they teach. By 2005 increasing numbers of distance teaching tutors maintained contact with students online as part of their teaching. However, little was known about how they organised and accessed resources for teaching and how and whether sharing resources with other tutors would be useful or desirable to them. Part-time tutors may have employment across a number of institutions, involving teaching similar courses, or topics. There was therefore potential for tutors to reuse online resources across institutional boundaries, across their different teaching roles and to share these with other tutors.

Although the term *resources* has been used in the other cases to refer to reusable learning objects and other similar online and digital teaching and learning content, it is used here in a broader sense. Resources within CS5-PROWE could be blog posts and wiki entries, also forum messages, emails, advice and feedback. Tutors reported in the focus group meetings that they reused and repurposed relatively informal resources such as their welcome messages, small resources such as examples of student feedback, in addition to resources to support teaching of specific topics. They also shared advice on practice, which was considered particularly valuable to those new to distance tutoring. Although this project covers a wide spectrum of resource examples, these did comply with the learning object Category 2 definition in Figure 3.1.

As an OU tutor on T171: You, Your Computer and the Net, and TU170: Learning Online, Computing with Confidence during 2001-2, when online tutoring was still in its early stages at the OU, the researcher was aware of the online tutor-only groups which helped to develop and

exchange resources and advice. T171 and TU170 had large student numbers and therefore large tutor populations (e.g. T171 had c.12,000 students and appointed c.700 tutors during 1999/2000). As observed in CS3-LORO these tutors would be working to a common schedule and addressing the same topics and activities with students based on a common course schedule. In these courses tutors were all learning how to tutor online at the same time and during the course could access plenary and regional online forums. This use of online forums for resource and advice exchange had continued in the 'technology' courses which succeeded TU170/T171, for example M150 (a computing course). These were referred to in the interviews with some PROWE participants and also in the focus group meetings.

There was thus a history within some faculties of tutors using moderated tutor-only online forums to easily share adaptations of (*repurposed*) resources relevant to the course. As noted in CS3-LORO, sharing could also occur by email.

Sharing resources, which included those created for previous course presentations, indicated that tutors kept a personal archive of resources, or they recorded or recalled where in past online forums they could retrieve messages with appropriate attachments or content. As noted in CS3-LORO (where participants were also OU ALs) access to online tutor forums (then called FirstClass conferences) was restricted to tutors teaching that course. For very large population courses access was restricted to the specific presentation pattern tutored (e.g. February start). Tutors moving to other courses or presentation patterns could not access online resources or discussions which they may have previously referred to, and may themselves have contributed resources to.

Resources stored as messages within forums also presented challenges when searching. They were identified by subject header and date, rather than tagging, with past discussions archived

at the end of each presentation. PROWE explored the potential for sharing resources within a separate informal repository not linked to tutoring a specific course, which tutors could draw on on a continuous basis, to allow resources to flow across course and presentation boundaries.

Initially PROWE planned to also facilitate inter-institutional sharing between tutors at the OU and UoL, however the decision to adopt Plone as the PROWE online blog tool at UoL, prevented this. Plone was being introduced at UoL as the system for sharing institutional information and for marketing. It was restricted access and unavailable for OU tutors to use. The OU instead used Elgg blogging/social networking software in conjunction with PmWiki. CS5-PROWE refers principally to research within the OU system, where all users were OU ALs, rather than the UoL system where most users were campus-based full-time UoL staff. To obtain a perspective on the UoL use of Plone, the research also draws on interviews with UoL academics (not part-time tutors as these were not available for interview). As with other cases, the researcher also reviewed documentation from the project, records of meetings attended, etc.

Two OU focus group meetings and a short survey collected perceptions and expectations of sharing online in advance of using the Elgg/PmWiki system. Concerns were raised then about copyright when sharing content found elsewhere. ALs were also concerned about the third party rights issues where materials from several sources were incorporated into a new resource. Copyright licenses apply within institutions rather than across institutions and this was recognised as a problem for sharing resources inter-institutionally. Tutors at the focus group meetings were unsure whether OU content *could* be reused in other teaching contexts, again because of the rights restrictions. These concerns were heightened by not knowing the others who were shared *with*, when using a PROWE-style university-wide system. This

compared with the forum-based system where sharing was only with current tutors teaching the same course

One advantage that tutors saw of storing online was being able to direct students to resources, a similar objective to that progressed through CS4-SORRS. Resources tutors reused were, on the basis of the pre-project survey (see Figure 6.3) most likely to be resources which the tutors created themselves or had previously used.

Figure 6.3: How PROWE participants reused resources at start of project

Do you like to reuse teaching materials? If so, when and how do you do this?			
	OU (n=15)	UoL (All) (n=15)	UoL (DL/PT only) (n=5)
Reuse/Repurpose material which I created or have previously used	11	12	2
Reuse/Repurpose materials made by others teaching the same course	1		
The institution provides the material and I reuse it.		1	1
Reusing materials from other universities	1		
New staff so no reason as yet to reuse.		1	
No/Not applicable	2	2	2

Source: Pegler (2007), based on surveys administered by Dr Anne Hewling (OU) and Roger Dence (UoL)

In the focus group meetings and in interviews, some tutors maintained that the nature of DL teaching at the OU meant that resources they created as tutors were not reusable in another (non-OU) context, and also there was little need for additional resources within their OU work. However there was agreement that an online space within which tutors could look for or request advice or resources would be helpful, particularly for new and inexperienced tutors who might not otherwise realise that alternative less formal resources existed. An experienced AL referred during interview to ‘memorial threads’ (PROWE A, 2007), forum messages which requested help or advice which experienced tutors were aware had been answered in previous course presentations. The previous answer or resource would be retrieved and reposted.

OU PROWE Project Officer, Anne Hewling, developed and circulated a questionnaire in the early stages of the project. In response to this one tutor identified the value in sharing experience of locating, using and adapting resources to meet the needs of a specific student:

problems with the course material and/or students are more manageable when shared with other tutors. I have had some good ideas provided to me on how to cope with a Tourette’s Syndrome student in a tutorial – common sense really but very helpful indeed. (Hewling, 2006, p14)

Resource examples developed by participating OU ALs within the PROWE wiki, included specialist resources addressing how to teach a specific topic to a student in prison, where the usual course activity was inappropriate. This is consistent with the example noted by Hewling.

At the focus group meetings, those who had tutored on T171 (or associated courses such as TU170, T175 and M150) were more likely to have clear ideas of how they would use PROWE, recalling how they had continued sharing and reuse practices developed in those earlier courses, for example:

the T175 tutor conference [forum] is, where people bring things, it's a full gift economy where people will come along and say 'These are the resources that I've put together for my next face to face tutorial. They're here if anyone wants to use them, edit them, take them, whatever'. (PROWE G, 2007).

I might possibly want to have different versions and possibly versions that other people have had. I know that one of the courses I tutor, M150, we actually have a big resources book conference that we store things in and lots of people come borrow other peoples resources and take them away and adapt them and bring them back again. So we do have different versions. You've got folders full of activities on Javascript and things like that. So people can rifle through and find which ones they like, which version might actually suit them. (PROWE C, 2007)

These tutors were amongst the most active users of PROWE, and the most experienced in using ICT in comparison with other tutors on the project. Their willingness to share may reflect confidence with the technology as well as prior experience in sharing and reuse.

During the period in which this case occurred there was significant movement within UK HE towards recognising the potential role of Web 2.0 tools within teaching and learning, including in sharing of digital resources. Franklin drew on this in his report for the JISC Digital Repositories Conference, 'Dealing with the Digital Deluge' (JISC, 2007), at which PROWE also

reported. He linked recommendations to JISC about Web 2.0 activity to the findings of the SPIRE 'Web 2.0 Services' survey (White, 2007) which suggested that 'The overall theme [of Web 2.0 activity] is of sharing: materials, ideas, knowledge, friends and contacts' (White, 2007, p18). From that report Franklin and van Harmelen (2007) concluded that Web 2.0 services offered academics more control over what and how they could share their resources, suggesting that less formal Web 2.0 services might be more appropriate than formal repositories. They directed this recommendation at HEIs engaged in traditional forms of education and not only distance educators and part-time tutors.

OU PROWE participants experienced difficulties with access to the project blog and wiki during the first year, and these were considered by some participants to be unfriendly systems. File handling (upload) problems and difficulties in finding things (searching) were mentioned by several interviewees. While technical glitches are not uncommon in projects using innovative technologies in early versions (e.g. Elgg version 0.4 was used), for part-time staff with limited time these may represent particularly significant problems.

A relatively lengthy explanation of context is supplied for this case because personal and informal sharing was an unusual focus for repository project activity.

6.4.1 PROWE: Distinctive themes explored

Three themes were noted as particularly relevant to this research, and are presented below, drawing on the PROWE evaluation activity and report (Pegler, 2007b).

6.4.2 Persistence of the 'project' service

Many projects promoting reuse are relatively short term and reliant to some extent on external funding. That was the position for CS3-L₂O, with reuse work continuing as part of a continuum of activity through a succession of funded projects. The impermanence of such approaches can cause tensions where there is no clear follow-through for the work achieved. For example, OU participants within CS5-PROWE were aware that the system might not be sustained as a service once project-funding ended. As the project progressed it became clearer that the systems used would not be adopted by the OU and awareness of this impermanence may have led participants to a more experimental and short term view of the activity than would otherwise have occurred.

Comparison can be made with the UoL system (Plone), which became adopted as part of the formal technical infrastructure of that HEI. The resources deposited in the UoL institutional systems could be drawn on after the project closed. UoL PROWE participants felt secure using the wiki to share key reference and reporting documents (PROWE L, M and N, 2007). In contrast OU users did not expect continued access to their resources, or continuous use of the Elgg/PmWiki systems.

As part-time staff of the OU, often balancing that work with other contracts and responsibilities, the ALs' availability to engage in project activity was limited. One interviewee identified experimentation and the time to learn and use further systems as a negative factor:

It just sort of fizzled out really. I don't know why. Because [there] is only so many hours on the day I suppose ... just becomes another resource that I have to manage. If we could get rid of everything and just have one? But to have that as well was too much I think. (PROWE A, 2007)

However, some OU participants migrated to using wikis and blogs outside this system, continuing collaboration started in PROWE: 'Part of the thing we [talking about working with PROWE G] were doing with this other project is collecting case studies that would go online and I have suggested to the project team that the online version should be an permanent Wiki and they seemed to be quite attracted to that idea.', (PROWE F, 2007). Several tutors taking part in the project, or the focus groups, already had personal websites which they used for supporting students. Some of these were in the form of professional and personal blogs, suggesting that for at least some tutors sharing resources with students outside the OU's formal systems, or linking out to external services, holds appeal.

6.4.4 Non-formal repositories and determining provenance

While tutors were familiar with the quality of educational resources provided by the OU, there was less certainty about the quality of resources provided by fellow tutors. Working within a course-related forum tutors build their experience of working together, and have a common basis around which advice or resource exchanges can occur. PROWE encouraged sharing across course boundaries, so although some tutors did recognise each other, most did not. The PROWE OU ALs, commenting within the focus group meeting, anticipated concerns later raised by LORO tutors (Tomás, 2009) about the usefulness of reviews and ratings and to assess the quality of a resource. When selecting amongst alternative resources to use they considered these as useful additional information. However, as resource contributors, they were concerned that their resources would receive no, or poor reviews. They felt that this would deter them from contributing further resources and might discourage initial contributions.

Although the term 'informal' was used to describe the activity in the JISC invitation to tender, the use of blogs and wikis as a form of repository in PROWE was mainly 'non-formal'. Erault (2000) distinguished between non-formal, formal and informal in talking about work-based

learning activity. While non-formal and formal sharing is expected to focus on largely predictable objectives or activities, anticipating the extent or type of informal resource reuse activity is more problematic. This may have no connection with the teaching or the shared work of ALs and relate to social chat. Although there were some informal exchanges within Elgg, (e.g. discussion of tai chi, digital camera purchases and holidays), most of the 'informal' activity noted within this project was of the non-formal rather than informal variety. Where social chat occurred, some users became concerned about wasting time. All OU participants wished there to be some moderation of the online environment, although given the nature of the users this could be 'light touch'. Informality in the sense of absence of control, raised concerns that the environment would become chaotic: 'It would be utter bedlam wouldn't it? Everyone with their own repositories and their own little hobby horse to ride ... you wouldn't be able to get a word in edgeways'. (PROWE A)

Judging the quality of material which had been passed around within an 'informal' context, where there was no clear agreement on what should be posted and what should not, was problematic. There is no limit to the range of resources which could be posted within an 'informal' repository. Discovering appropriate resources is challenging for users if, as was the case here, tagging and descriptive metadata are informal or lacking. Although the amount of content within PROWE did not become extensive enough to pose a challenge to users, a non-formal longer-term repository could present challenges not only in how to find content, but also how to differentiate between high and low quality resources. As one respondent to the SPIRE Web 2.0 Services Survey pointed out: 'My main concern with collaborative schemes in general – as opposed to specific sites where I respect the judgement of contributors - is the prevalence of uninformed opinion masquerading as fact,' (White, 2007, p17). The broader the spectrum of contributors the greater the problem posed.

While tagging of resources was possible, experience of projects outside PROWE illustrates that even where tags are used these may not be helpful. In 2005 Lou McGill (McGill, 2005), referring to the DIDET (Digital Libraries for Distributed, Innovative Design Education and Teamwork) project (Grierson, *et al.*, 2004), where students use informal metadata/tags, the lack of formal guidance resulted in '600 files called "can crusher"' (McGill, 2005). Within PROWE tutors looking for expert resources recognised that those with novice interest might use the same tags as experts: 'If everything was in the same repository and I go "Now what have we got on JavaScript" I would *get all sorts of dross*' (PROWE A, 2007).

PROWE illustrated a dilemma concerning *personal* and *informal* repositories without limits on the type of resource or post shared. Requiring formal ways of labelling, storing or accessing content would be inappropriate (not *personal*) and also insufficient without establishing boundaries (not *informal*). This sets up problems when searching for resources deposited by others, although poor or inconsistent tagging also means that the tutor may not be able to find content which they previously stored for their own reuse. Not only the range but the type of resources stored digitally within informal personal collections represents a more diverse pool of resources than is generally available via formal collections. It can include work-in-progress or drafts as well as resources not intended for sharing directly with others. While the way in which resources are identified and described when stored can limit reuse potential, users of PROWE were particularly likely to be time-poor when entering metadata (tagging) and also when searching.

If the origin of the resource is a use discriminating factor, one way in which higher quality resources could be identified would be connection with a known source, e.g. a known brand. One tutor applied this rule: "'Has it got the OU logo on it?" Because I tend to trust – not

blindly and not uncritically – but if something has the OU badge then at least I have some idea of the quality that I should expect from it' (PROWE G, 2007).

Participants were able to read most of the content in the PROWE blog and wiki because it was not voluminous, but they saw the potential of the personal profiles in discovering information about who was sharing resources and/or offering advice. Profiles were analogous to the resume in FirstClass conferences (forums) which some of the tutors already used to provide information about themselves. This is consistent with informal and social sharing and was also mentioned as important in the later CS3-LORO. Tutors offered three examples of how they might use profiles to select resources:

- 'If I found a particular resource from a particular person that I found really useful I might go off and then search for that particular person and see what else they've done rather than looking for a specific subject all the time', (PROWE C, 2007)
- 'I don't believe that everyone's opinion is the same worth as anybody else's because in this world it isn't. If you're looking for the answers to some problems it's nice to know that the person who has provided a possible way forward has actually been here before and is not just spouting nonsense. So I liked the profile, I liked the idea of profile' (PROWE A, 2007).
- 'The interesting thing about profiling that it lets you do was actually it picked up on tags and things so you could go and find the 'other' things that you were interested in and you would say 'Oh look, it's highlighted this. I wonder if everyone else is thinking about this?' and you could go off and chase it'. (PROWE C, 2007).

Once familiar with the contributors, a name rather than a profile could be an adequate filter. Drawing comparison with how he worked within other much larger OU online communities, one tutor described how he was drawn to posts from particular contributors: 'It's like being on an active conference; I look immediately to the subject line, who's posted, and if I think someone's going to say something interesting ... you know anything by John Woodthorpe I immediately open...' (PROWE E, 2007). Woodthorpe was a well-known OU Technology faculty tutor who had moderated several course-wide tutor conferences in the past.

Users identified knowing who they were sharing with, as well as whose work they were using, as a concern. PROWE B expressed reservations about proactively offering resources within a broad community. She was more comfortable responding to specific requests for help or resources. This was consistent with the tutor's use of online forums in CS3-LORO, and also the sharing within course forums that tutors were already accustomed to:

If another tutor asks me for a resource that I've mentioned that's fine, but it's not the sort of thing I'd send out because everybody has their own personalised view of what they are producing and another tutor might think something different about it. But I would want control I think and to keep it very localised to me and my groups. I don't think I'd want everything to be widely available to everybody. (PROWE B, 2007)

The same tutor was more comfortable sharing research findings with unknown others than she was in sharing her teaching material. As Section 4.3.4 noted, there is a distinction between research dissemination and teaching resource dissemination with the former not subject to repurposing once shared. This model may provide a greater sense of control for the sharer.

6.4.5 The personal repository as personal or public archive

One purpose of a repository is as a 'keep-safe', providing a secure persistent external archive.

This has been identified as one of the functions of Jorum (Siminson, 2010). In the start-of-project PROWE survey (Hewling, 2006) and also at the focus group meetings, a variety of approaches to saving and storing content for personal use were identified. Several tutors already kept multiple copies of files, including past versions:

I'm paranoid about actually saving stuff on my computer and everything I do I save on my laptop, save to my PC and save to hard drive as well. If it was something really important that I couldn't save I would probably put it on a website like this. ... I've got handouts going back to 2000 on my computer that I use as my own sort of database file thing that has resources that I can change and adapt. If it was something for a current course I'd want them to be safe and then just change them. (PROWE B, 2007)

As well as organising resource versions in chronological order, some tutors thought it necessary to ensure a clear difference between versions intended for different audiences. This suggests that there may be additional work involved in sharing a resource with others, as there may be different options to locate or choose between, or a new version may be created.

PROWE ALs in interviews suggested different approaches:

I guess with the resources I do share, they do have dates on so you can tell which is the latest one and which is the most appropriate, I guess if I was doing it ... publishing it on a website I'd probably want to remove the early one and then add on current versions and then change any descriptions, change any key words I've made. (PROWE B, 2007)

I can see that you would want three different ones. One would be the public one – public to those people who are paying for the course. One would be an archive so that

you could go there to find things that would be useful. For instance if you thought 'This is the same sort of TMA as we had two years ago and that one I remember caused grief' what did we do about it then? And then you would want a third one which would be where you were working on the next iteration of the course. (PROWE A, 2007)

I only keep the one that I need. I don't keep old versions. I always overwrite. ... coming back to the memory sticks I make sure that I only have one version on the memory sticks. (PROWE G, 2007)

The first two quotations suggest that these tutors see sharing proactively as additional work. It was not clear whether they also undertook this additional activity when adopting the existing reactive approach of responding to requests for resources. They may have provided explanation tailored to the user in an accompanying email or forum post without adapting the resource. Had they versioned the resource in the ways outlined above they would have known that the resource was likely to be used or referred to. This was not necessarily the case when sharing proactively in a repository, where additional work could be found to be unnecessary. The third quotation suggests on-going active version control and it is presumed that this single latest version would be the one shared with others.

The tool used, Elgg, allowed some resources to be kept personal and not shared or visible to others. However, within this project, users suggested uploading to an online repository was synonymous with making the resource public and preferred other strategies than the option of making the resource 'private'.

- I did [make it private] at first. And then thought there's no point writing a blog if nobody's going to read it. But if there's something I don't want to publish widely I

could actually use draft. I wouldn't put it on rather than make it private. (PROWE B, 2007)

- If I'm going to store them online I put them on Blackboard. But I would only put things online so that other people could access it. Mainly things are stored on my own personal files within relevant programs. (PROWE J, 2007)
- I can see situations in work and with study where I might want things to be private to start with and then once I'd reached a certain point with them I might make them available to perhaps a small group. Because then it's all in one place anyway and I'm not having to develop it in one place and then upload it later when I was ready to do it, I could just develop it in the one place. (PROWE C, 2007)
- If it were being used for real work then, yes, I would want private to me and private to particular groups as well. Private to TT281 tutors. Private to M150 tutors. Private to R04 Maths tutors loads and loads of privileges and access rights. (PROWE A, 2007)
- I wouldn't have trusted myself to put stuff in the same place as stuff that was going on as 'logged on' or 'public' and make sure I'd pressed the right button. So I decided that if I did have stuff I wanted to keep private I would actually keep it private by writing it on my computer and only put it on Elgg when I thought it was in publishing form. (PROWE F, 2007)
- ... the last time I did, I'd put it in the public sector where everyone could read it and I thought I'd put inside where you needed special access to get it. So in that sense I'd done it wrong... None of these things are straightforward. (PROWE B, 2007)

These comments reveal preferences for keeping private resources (which may include archived resources) in separate locations to the shared resource. They may be stored offline or in different systems, e.g. Google docs. This reinforces the idea of extra effort being required to share resources after they have been stored. The resources would need to be moved, or the permissions adjusted in order to share. As noted previously some versioning for a new audience may be undertaken.

Several of the comments also highlight the disparity in ICT skills between different HE teaching staff. Although these were all tutors who taught online and were competent in using the online tools within PROWE, some were concerned about the risks of accidentally publishing online if they mistook the permissions.

6.4.6 Case Study 5: Other factors

As with the other cases, a number of issues were raised during the research that are not commented on in the main case themes. These contribute to the cross-case analysis in Chapter 7 and are noted in Insert 7.1.

6.4.7 Case Study 5: Conclusions

CS5-PROWE provided information on how part-time tutors developed their personal resource management strategies and what they might expect from an online personal resource management system (PRMS) (Hewling, 2006). In doing this it identified concerns about sharing and reusing content online within communities which were not formal or course specific and where participants might not know each other, or work in the same discipline areas. These contexts for reuse were particularly relevant given the suggestions that less formal, Web 2.0 systems could replace formal repositories (Franklin and Harmelen, 2007).

Within a non-formal or informal repository lack of controls will lead to deposit of content which is diverse in scope, level, accuracy, vocabulary, finish and description. Users may have a different expectation about their control over sharing within the system, for example wishing to choose who they can share with by developing their own levels of permission. Different understanding of rights and attribution occur, as some of the work will be work-in-progress and not intended for publication, in contrast with more formal or conventional repositories. This has implications for reuse, both in shaping expectations of what useable content participants will find in such a system, and what may be appropriate to share there.

The PROWE project was distinctive in considering informal and personal repository strategies, based on exchanges of reusable resources and advice between part-time educators. Many of the OU participants had previously shared practice as well as resources online, and continued to do so, carrying this as an expectation from one course to another. This past sharing was on the basis of a common course, or discipline connection within a group which had a clear context and purpose to the sharing. The activity occurred within established OU systems, and additionally through personal blogs or websites which the tutors maintained and controlled outside the institution. PROWE offered access to a different style of system for sharing, however this was one over which they had relatively little control, and was not part of the institutional systems they were required to use for tutoring. To invest effort within a system which had an uncertain future and appeared to offer no clear benefit over other systems lacked appeal for users, although some appear to have found the tools useful and set up wikis for separate specific projects, to share and develop work in progress. Others, as already noted, maintained personal blogs throughout and continued to share and develop these after PROWE. This suggests that Web 2.0 tools may be of interest to some tutors, although within a context which they either can control, or one with a clear purpose and a membership associated with that purpose.

This is consistent with one of the main conclusions from this research, that there is considerable emphasis placed by sharers and users of reusable resources on knowing who they were sharing with, e.g. who the resources (or advice) had originated from. The idea of 'provenance', emerged, with several interviewees commenting on the importance of the identity of the source and the experience of those offering resources. This information helped to establish the authenticity of the advice, or the quality of the content, often based on past experience. In determining whose resources to trust, or even to devote time to exploring, the reputation of the creator appeared to be a particularly important deciding factor within an informal, wide-ranging system. Relating this to mesoenvironmental analysis, using social networks to establish the identity of resource providers around learning resources appears to reflect Jyri Engeström's ideas around social objects (Engeström, 2005).

Information about the identity of the creator(s), or their institution, was valued as indication of appropriateness of resource quality and was preferred to rankings or ratings. One tutor offered a detailed explanation, reflecting on his practices within formal fora:

[talking about FirstClass] ... there are some people that I will read and other people I just won't bother with. It's this idea that we build up a history. We need a first level filtering system that helps us with determining where to look, but beyond that I think that we build up a mental bank of credibility for people. ... It's that people that I find credible are the people that I tend to go back to and look for their thoughts on 'x y and z' and if they were generating material I would look for their material on that. And not uncritically, I work closely with people like [TUTOR NAME] and [TUTOR NAME] and people around here, and we are very critical about each other's work and we are explicitly critical of each other's work because have that trust set up. But equally I would go and look at their work before I look outside that group because I trust what they do'. (PROWE G, 2007).

As Figure 6.3 suggested, the participants in PROWE (both from the OU and UoL) were most likely to see reuse in terms of adapting for new contexts materials which they had themselves created. Although the emphasis on reuse at the macroenvironmental and mesoenvironmental levels had been on reuse as using someone else's resources, reuse by the original author occurs frequently in practice. Although one of the distinctive advantages of online repositories is to connect users with resources and creators which they are unfamiliar with, this project suggests that repositories could have a valuable role in supporting organised storage and a purely personal repository, or for sharing between a relatively small group of participants who are familiar with each other's work.

The ALs interviewed all had their own personal back-ups and collections of resources, ranging from CD-ROM collections, to copying across multiple machines, to online storage. If a repository were to fulfil this storage function for individual tutors, offering storage which was restricted access, where the tutor could manage permissions, this could represent a first stage towards wider resource reuse. Tutors who tagged and uploaded resources for their own purposes, or for sharing within a small group, could then more quickly and directly respond to requests made by others beyond that group, leading towards greater open reuse. Before this becomes a realistic approach tutors will need to be more confident about the technology and their own technical skill in managing permissions.

6.5 Context of Case Study 6: NDLR

6.5.1 Rationale for including Irish HE case

In selecting cases for this thesis it was hoped to include a national level repository with a broad cross-curricular set of users. Although cases of this scale are relatively unusual, they represent one of the broadest range of users and resources possible within a national context.

Within UK HE the Jorum national repository was the only repository which could fit this brief and this was therefore considered. However, the chronology of Jorum's development (i.e. starting within a time frame close to that of the 'other' national case, CS3-Stòr Cùram) meant that the two initiatives shared common features (e.g. the approach to metadata and choice of repository software). Also Jorum, while typical of national repository initiatives of the time, was in one significant respect atypical, as all JISC- funded projects were required to deposit outputs into Jorum. In this respect its experiences were not generalisable, although similar arrangements may exist for national repositories elsewhere.

During 2007 the researcher became aware of the National Digital Learning Repository of Ireland, and its community-of-practice based approach. This differed from Jorum and the other cases studied, reflecting an approach to reuse facilitation, consistent with a cross-disciplinary repository, but with emphasis on discipline-based sharing. The NDLR was therefore adopted as the sixth case for this thesis. However as it is not based within UK HE, this case study is descriptive, rather than explanatory or exploratory case (Yin, 2003). For this reason factors arising from this Irish case are not included in Insert 7.1.

As the description of the case context shows, this is a case which offered several contrasts to the activity in the UK. The NDLR was reacting to the same mesoenvironmental influences noted in Chapter 3, but subject to a different national set of macroenvironmental drivers. (Strunz, 2011), Chief Technical Architect of the Irish National Digital Learning Resources service (the title used by then to describe the NDLR), has emphasised that this is an approach that may work only within the smaller scale of Irish HE.

6.5.2 Overview of the NDLR

The NDLR was set up in 2004 as a cross-institutional project and supports all HE teaching providers in Ireland. Because of the relatively small size of the Irish HE sector in contrast to the UK, each institution has membership of the NDLR board and can actively participate in NDLR planning and decision making. This strengthens communication across the partners and is viewed as building trust, confidence and commitment in the service, which has persisted in a difficult economic climate (Strunz, 2011). In representing a variety of institutional interests there were similarities with the setting up of CS2-Stòr case, although in that case there were three particularly active partners. The original proposal for NDLR was more limited scope. It was planned to establish a service serving three Dublin-based universities (Trinity College Dublin, University College Dublin and Dublin City University (NDLR C, 2009)). The scope of the project broadened to cover all seven universities in Ireland at the request of the Irish HEA (the funding equivalent of HEFCE). Within its first year the NDLR was further extended, to include 13 Institute of Technology Colleges (NDLR, 2008). From this point the project worked across the whole of the Irish HE sector with the 21 partners are shown in Figure 6.4.

In common with many of the UK HE cases the initiative had a broader change remit than simply promoting resource reuse. Although it was established as a repository service, the project set out to develop a new culture of sharing teaching practice, making practice

examples more visible and accessible inter- and intra-institutionally. The NDLR has supported this through activity at individual, institutional and community of practice level, engaging potential users through workshops and conferences as well as offering one-to-one advice through local advisers.

Figure 6.4 Institutional partners in NDLR

Universities
Trinity College, Dublin Dublin City University National University of Ireland, Galway National University of Ireland, Maynooth University College, Cork University College Dublin, Dublin University of Limerick
Institutes of Technology
Dublin Institute of Technology Athlone Institute of Technology Carlow Institute of Technology Cork Institute of Technology Dun Laoghaire Institute of Art, Design and Technology Dundalk Institute of Technology Galway – Mayo Institute of Technology Institute of Technology Blanchardstown Institute of Technology Tallaght Institute of Technology Tralee Letterkenny Institute of Technology Limerick Institute of Technology Sligo Institute of Technology Waterford Institute of Technology

Source: NDLR website, <http://www.ndlr.ie/>

The goals of the NDLR project at the time of the research (2009) were to:

- support academics in the collaboration, development and sharing teaching practices, experiences and learning resources

- provide access to digital learning resources across all academic disciplines across all academic subjects for Higher Education
- enable sharing of learning resources by academics across the Universities and Institutes of Technology
- investigate the requirements for a national digital learning repository service and to provide the system and service specification for a full National Digital Learning Repository
- provide guidance as to digital rights for shared resources
- provide infrastructure and shared expertise to support subject or discipline-based communities in higher education. (NDLR A, 2009)

Although providing a repository system is mentioned as one of the aims, this was within a wider mission, with a focus on establishing and maintaining communities of practice (Wenger, 2000). The word 'repository' has been subtly de-emphasised over time, until the acronym NDLR in 2011 stood for National Digital Learning Resources.

The 24 NDLR Communities of Practice (CoPs) operated across the HEIs and were established as an approach to supporting collaboration and communication within academic disciplines across both the Irish Universities and Institutes of Technology. These CoPs have supported not only training in the use of the repository, but also advised on how to create learning resources (learning objects). The NDLR CoPs are independently led and the variety of approaches support engagement of members and their different outputs. Building on disciplinary rather than institutional community reflects macroenvironmental observations on the importance of the disciplinary connection (Jenkins and Burkill (undated), Healey (2000)) noted in Section 2.6.1.

Not all communities were active across all institutions and not all institutions were equally active in the NDLR. For example, Trinity College Dublin, was the base for the NDLR operation,

its coordinator and manager were located there, and annual NDLR conferences have been located in Dublin. Several institutions were the 'home' HEIs for coordinators of the communities of practice. In the case of Trinity, two of the CoP coordinators are based here: TelCoP (Technology Enhanced Learning CoP) and the Nursing and Midwifery CoP. At one institution (Blanchardstown Institute of Technology) three coordinators for a single community of practice (the Apprentice-Based Learning CoP) were located there.

Membership of communities also varied. The NDLR Computer Science community of practice in 2006 was an active community, listing 56 members from 18 institutions. The remit of this CoP was clearly broader than simply creating or reusing learning objects. It identified its objectives on the NDLR website as:

- To establish a national focus for the dissemination of best practice in the teaching of Computer Science at undergraduate level.
- To develop a range of learning objects which will comprise sets of animated simulations of commonly taught algorithms and architectures
- Development of the subject area network to enhance the teaching of computing in undergraduate programmes by providing a core set of shared learning resources

Our long-term goal is to create a virtual community bringing together people working in Computer Science Education departments, sharing ideas, providing support and collaborating on projects. We hope that through this community we can build and sustain a meaningful and valuable repository of learning and teaching resources. (NDLR Computer Science Community of Practice, 2006)

The sharing of resources was seen as integral to this CoP's work, but was not the limit of its activity. This community also identified a type of learning object to be developed, i.e. 'sets of animated simulations of commonly taught algorithms and architectures', giving participants a clear expectation of its outputs. As NDLR B noted, the legacy material available within specific CoPs, reflecting its previous resource formats and readiness to upload, may also vary:

the Architecture [CoP] has a lot more learning objects up there than some of the other categories. And it's just by virtue of who is contributing. You know, and who has the material already digitised, so they can just upload. And also who has time to do it.

The Computer Science CoP website offered a link to a sample resource, a RLO-CETL learning object supporting teaching of Java programming arrays. This was developed by Professor Tom Boyle and he, and other members of the UK-based RLO-CETL provided workshops for the NDLR. Dr Clare Bradley, a researcher from the RLO-CETL, also evaluated a sample of the learning objects using the LOAM tool developed by the RLO-CETL (Bradley, 2008). Both NDLR and Jorum initially used intraLibrary as the basis for their repository system although both later adopted different systems for open educational resource delivery. These connections show that the project had strong links with reuse activity within the UK HE sector. Their mesoenvironmental scanning was not limited to the UK. Illustrating their international links, a keynote speaker at the 2008 NDLR conference was Ahrash Bissell, then Executive Director of ccLearn, part of the US-based Creative Commons organisation. By 2008 NDLR were already moving towards becoming an open repository, a move which Jorum was also considering.

Initially established as a three-year project (2004-2007), funding for NDLR was extended to a fourth year (2008) to allow for fuller engagement with the pilot NDLR repository services and activities. An evaluation was carried out during 2008, with reporting and evaluation continuing into 2009. CS6-NDLR has therefore been described as having a 'four-year pilot' (NDLR, 2008).

The most recent stage of activity, which was anticipated at the time of the interviews with NDLR staff, was the move during 2009-10 to open access using a Creative Commons license.

The opening up of the NDLR is beyond the scope of this research, although it reflects a trend towards openness in other cases (e.g. CS2-Stör and CS3-LORO). With this move, the repository became available for use by participants beyond the Irish HE sector, and also student users within Irish HE. The emphasis in opening up the NDLR has been on making the repository visible to a wider range of *users*, including students, rather than increasing the number of communities depositing content. Without this opening up, external collaborators were only able to gain access to the repository by means of a Memorandum of Understanding. With this change the NDLR was able to work more directly with practitioners within UK HE.

6.5.3 Case Study 6: Conclusions

The presentation of CS6-NDLR has been briefer than that offered for the UK-based cases, with intention of introducing a different reuse facilitation model to those available within UK HE.

The most obvious difference was in the scale and type of support provided to users and potential users, either as individuals or as members of the CoPs. In addition to an annual symposium/conference, there were activities for the community of practice coordinators, external events presented by leaders of the RLO-CETL, regional events and videoconference events. NDLR events and workshops were publicised by the Irish HEA and the partner HEIs as part of a wider national programme supporting higher education activity rather than as separate, specific, resource reuse activity. In parallel to the centrally-organised activity, each CoP provided support and a focal point for disciplinary discussion and networking.

Illustrating the one-to-one support available at some HEIs, NDLR B recalled her role in helping to develop multimedia resources for staff at the University of Limerick and how the design and content was later reused. She worked with a lecturer on the production of a learning object to teach Japanese hiragana. The lecturer obtained beautifully-drawn characters created by a native Japanese which were revised to create a second character set, which covered the same sounds, but different characters. It was possible to reuse the original sound files (assets) which saved time and resource. NDLR B was also able to reuse the same template, having designed the original to be usable by students with colour blindness, and with an uncluttered design suitable for several uses. Development time for the second set was reduced by several weeks and the sound files were later reused in other ways.

Many of the issues and impressions noted in the interviews with CS6-NDLR participants reflected similar experience to that recorded for UK HE cases. For example, recalling experience of reuse arising from resource availability in easy-to-repurpose form (similar to CS1-H806), NDLR B described an example from Physiotherapy teaching. A stick figure animation had been created to identify the eight stages of gait, showing which muscles were working. A further version was created as a self-test of students' reuse possible because the work had:

already [been] done from the first object ... I was quite busy at the time ... but I knew all the stuff was sitting there on the CD and I knew it would not take nearly as long as the first one ... But there is no way I would have committed to it, had it not been there.

(NDLR B, 2009)

The 'four year pilot' period for CS6-NDLR contrasts with the short span of most project-based cases, although it reflected the time taken to establish repositories committed to providing an on-going service (e.g. CS4-SORRS). This was also the length of time taken to move from L₂O

activity which established CLARe, to the community sharing within LORO and HUMBOX, based on this (Case 3). The continuity of funding helped NDLR achieve its objective of building a relationship with the partner HEIs, and its sponsor, the Irish HEA, has endorsed this project as an effective model of inter-institutional activity (Strunz, 2011).

NDLR COPs were able to tailor benefits and activities to their communities, emphasising the positive contribution of the *preparing to reuse* process, rather than focusing on reuse itself. For example, leaflets publicising the Biotechnology CoP and circulated at the 2008 NDLR symposium suggested that engagement with this CoP offered these advantages:

- The chance to discuss your teaching and learning ideas with enthusiastic peers.
- Recognition of the quality of your own resources by others.
- A chance to increase your reach in terms of learning object distribution within the HEA sector in Ireland. (NDLR Biotechnology CoP, 2008)

These were immediately achievable benefits within the short term, in contrast to the longer-term less certain prospect of time saving, institutional brand building, or saving costs, which have often been suggested as the advantages of reuse activity (Pegler, 2012). The Biotechnology CoP list also related these benefits to the needs of individual educators rather than the institution. Finally, these were also outcomes which were attainable without requiring commitment from participants to changes in teaching practise or adoption of specific technologies. This emphasis on immediate rather than longer term incentives to engage with reuse should have appeal to the potential users of the CoPs, who would also become the users of the repository.

The support, continuity and emphasis on disciplinary community offered by NDLR created a national environment in which sharing and reuse was more likely to occur. However the benefits to individuals, and their institutions and disciplinary communities, were not

dependent on reuse. This is consistent with the wider objectives of funders noted throughout the cases, where there has been a wider objective to change practice through resource reuse initiatives

Chapter 7: Reuse across cases: cross case analysis

7.1 Comparison of cases

While each case provided information about reuse within a specific context, through cross-case comparison it was possible to compare factors affecting individual cases and identify whether these were also mentioned in other contexts. Each case provided opportunity for triangulation of the data obtained with that derived from the other cases. In Chapters 5 and 6 some of the common themes have already been noted. Through cross case analysis an overview of activity could be generated which identified common experiences and expectations of reuse generalisable across the sector. This chapter addresses these common themes in focusing on what Stake (2006) described as the wider research 'quintain', or target of cross-case analysis. This moves analysis beyond the narrower focus of themes identified within the individual cases.

As Chapter 4 showed, care was taken when selecting cases to choose examples which represented a spectrum of reuse facilitation activity. Selection also ensured a chronological mix, to reflect shifts in the macroenvironment and mesoenvironment activity within the period. The six cases represented variety in terms of the timing, approach, maturity, audience and scope of the reuse facilitation. These differences resulted in cases representing different scale, purpose and funding arrangements, which were typical of examples from the period. Through examination of interview and other data from these cases an extensive list of factors with potential to affect reuse were identified.

In Chapters 5 and 6 analysis was directed towards what could be understood from each case. Consistent with the interpretivist research paradigm and the iterative nature of the research,

there was no unified research instrument adopted across all cases. The approach taken to creating a cross-case factors list was use of open coding to identify issues within each case, focusing on the interview and observation transcripts (UK HE cases only). Coding occurred shortly after the interview or observation was conducted, and again in preparing the thesis. Other case sources were also referred to in drawing up the list of factors, including project documents, websites and records of meetings at which the researcher was present. These sources were referred to for comparison with, and verification or augmentation of, the transcribed data. A list of 222 factors identified from Cases 1-5 was then aggregated within a single document (Insert 7.1) to inform cross-case comparison.

As the research instruments varied for each case and the focus of research within each case differed, the frequency with which factors were mentioned *within cases* was not relevant to the cross-case analysis. The diversity of factors identified was of more significance in comparing cases and drawing conclusions about the sector. The 222 items listed in Insert 7.1 therefore amalgamate repeated mention of the same or very similar factors within a single case. The notes within the insert illustrate this repetition within CS5-PROWE. Even with amalgamation the case-specific lists were longer for those cases where there were greater numbers of transcribed interviews (e.g. 44% of factors noted derived from the PROWE interviews) reflecting the richness of the primary data. Within the cross-case list the factors identified through coding have been expressed as a short phrase, using natural language, to capture the sense of the original quote(s) or observation(s).

The factors listed represented experiences from a blend of projects, services and research initiatives within which context-specific as well as general factors and issues might be expected to occur and to change, or to shift in emphasis, over time. Some factors were unique to specific cases while others (e.g. concerns about metadata) were persistent and mentioned in

several. Insert 7.1 includes examples where similar comments and experiences are repeated across more than one case. For example:

- Technical problems preventing users accessing, or making access difficult, and thus discouraging sharing or reuse (Insert 7.1, factors 1, 80, 123)
- Concerns about rights and what was permissible when sharing beyond the original context (Insert 7.1, factors 71, 156);
- Strategies for identifying suitable resources of appropriate (fit for purpose) quality (Insert 7.1, factors 30, 82, 159);
- Anxiety about loss of control when sharing resources with others (Insert 7.1, factors 62, 220);
- Challenges in describing resources accurately (Insert 7.1, factors 9, 31, 101);
- Uncertainty about the benefits to the person(s) sharing (Insert 7.1, factors 60, 217).

Within a qualitative study of diverse cases the researcher felt that *all* the factors mentioned were potentially relevant to building a robust view of reuse and repurposing activity and its facilitation across the research period, even where these factors were noted only once. Rather than ranking or rating and weighting, individual factors were recorded then grouped to represent similar issues within a case clustered together.

The reuse lifecycle is one with both supply and use aspects (Figure 1.1) and the same or similar factors frequently applied within cases to both sides of the cycle. For example ‘robustness of system’, or ‘user-friendliness of technology’ applied to the early-stage user of the system when *obtaining* (e.g. locating and uploading new resources), *labelling* (e.g. entering metadata) and *offering* (e.g. creating feeds or flagging as popular/new items). Users concerned with these early stages, would typically be setting up a repository or wishing to share resources. CS2-Stòr,

offers examples of this with its emphasis on taxonomy building and metadata. The same broad observations on robustness and user-friendliness might be also applied by later-stage users to their activity, focused on *selecting* (e.g. searching and previewing), *using* (e.g. downloading or creating persistent links to the resource), and *retaining* (e.g. uploading repurposed versions). Using a further specific example from the cases, the maintenance of resources deposited represented different concerns for the early-stage supplier (for whom this could mean additional work), and the later-stage user (for whom they might represent an assurance of quality). The list of factors was therefore more extensive than a simple single linear listing, as in addition to differences in frequency of recording within cases, each factor could affect both supply and reuse at different stages of the lifecycle, within different contexts.

While coding identified a list of factors based on the case studies, including barriers and enablers potentially generalisable within the UK HE sector, this was not helpful in anticipating how other, unrecorded, factors might influence reuse facilitation. For this reason a broader classification, informed by the listing of barriers and enablers, was developed. Within this unrecorded factors could be categorised based on three broad types of factor observed. This chapter explains the rationale for this broad classification scheme and an analysis of the 222 factors against these classes.

7.2 Exploring cross-case classification: Three types of factor

The diversity of the issues (factors) identified from the cases was unsurprising given the range of reuse facilitation strategies reviewed and the lengthy research period. The object of the classification system was to group factors which appeared related to each other to allow identification of generalisable, context-independent themes from the cross-case analysis. The researcher had a further theory building objective in adopting this approach. It was expected to provide a means to classify factors not recorded in these cases, but which could emerge

from other practice examples within the sector. Of the 222 factors recorded, 221 could be placed in at least one class. This suggested that the classification was appropriately exhaustive. Although, as noted earlier, some factors overlapped two or more categories, 71% of the 221 categorised factors (158) were allocated to a single category. The majority of factors were thus exclusive to one of the three categories. Only 26% (57) factors were allocated over two classifications, representing more complex factor descriptions, with an additional 6 factors (i.e. 3% of the total list) appearing in all three classes.

Those six factors (coloured orange in Insert 7.1), were classifiable within each class because of a lack of distinctiveness. These were either relatively weak claims or comments, or particularly general ones. For example, 'Would be useful to allow comments on the objects [resources] while reviewing' suggested a *technical* modification to the repository. However, this same observation could also suggest a preference for this approach to sharing (i.e. suggesting *motivation*), or it could be used to evaluate and differentiate between resources, using the comment function (i.e. assessing *quality*).

The three classes, Technical, Quality and Motivation offered sufficient scope for classification of the full range of factors noted, and sufficient discrimination between most factors on the basis of one, or less frequently, two classes. This allowed cross-case analysis on the basis of the characteristics of a class of factors and the relationship between these classes. The characteristics of the three classes are briefly described below:

- **TECHNICAL factors.** These centred on the technical issues and activity associated with reuse. The term 'technical' not only concerned technology, but also other problems and solutions which were addressed through technical, including legal or standards approaches. It included approaches to recording and sharing resource

descriptions (metadata) such as standards-based agreements. Technical factors also included consideration of what form of rights or license agreement was chosen.

Some factors could also be classed within the technical + quality or technical + motivation categories. Technical tools/systems may be available to comment or access information which allows assessment of quality, or the the quality of the technical tool or system could be a key factor (e.g. of metadata in CS2-Stòr). The quality of the technical tools or service could be sufficiently high to motivate sharing or use, for example through moderation of help forums (CS5-PROWE), or support in using tools (CS6-NDLR). The presence of innovative technical aspects to the project or service could represent research potential which could motivate some users to become actively involved. CS1-H806 attracted academic research, as this was the first course to use RLOs extensively. CS5-PROWE attracted some OU AL participants because of its use of blogs and wikis.

Technical factors were the least frequently listed factor. Only 36 factors (16%) were classified as solely technical factors. However, as the mechanism for recording factors removed duplication within cases, several participants could mention the same factor, or repeatedly mention it, but this would be listed only once for each case. Five of the ten interviewees in CS5-PROWE mentioned in some form the same technical reservation: 'Technical barriers can stop reuse happening, or move it into an alternate system' (Insert 7.1, factor 123). This was the highest proportion of PROWE participants (50%) to identify the same factor. The statement itself indicates that this factor could act as an important, or absolute, barrier to reuse occurring.

- **QUALITY factors** related to the resources for use or sharing, and could also refer to the quality of the experience of sharing or use (e.g. the service). Quality factors could overlap with Technical issues, e.g. referring to the quality of metadata, they could contribute to motivation, e.g. the resource could be multimedia (CS2-Stòr), or topical (CS1-H806), or branded by a reputable source (CS5-PROWE). Quality was the second most diverse category, with 100 of the 221 factors related to quality and over half of these 55 (55%) classed solely as Quality factors.
- **MOTIVATION factors** related to the purpose of the reuse (sharing or use) activity, recognising that the resource itself may not result in reuse (either sharing or use) no matter how sophisticated its technical reuse attributes, or how excellent its quality. The emphasis on interviews with individual participants weighted the factors recorded to personal statements of interest, however this category could also include the motivation of funders of reuse, or those engaged in research rather than practice.

If the Technical classification referred principally to factors addressing the 'How?' of reuse, Quality referred mainly to the 'What?' factors, and Motivation addressed the 'Why?' factors. As might be expected this was the most diverse of the categories with 115 of the 221 factors identified associated with this classification. Of these 67 (58%) were classed as solely relating to Motivation.

Figure 7.1 shows the 222 factors identified and coded using this classification scheme.

As already noted, the frequency with which a factor is mentioned is not an indication of its importance. For example 'Integrating with institutional systems may delay or restrict' (Insert 7.1, factor 87) was recorded as a *single* technical factor influencing reuse facilitation in CS4-

SORRS. However, as observed in Section 6.3.2 this was a highly significant factor for the project. The higher numbers of factors classified as ‘quality’ and ‘motivation’ suggests not greater importance for these issues, but greater diversity in how they were perceived and talked about. These may be issues which users lack an established vocabulary to describe, or factors which are particularly sensitive to context, or which invited fuller discussion during semi-structured interviews.

Each of the three factor classifications is considered in more depth in the following sections.

7.2.1 Technical class of factors identified in reuse and repurposing

Technical factors have been identified with both problems and solutions in this research. At the macroenvironmental level technology was often seen as an unproblematic solution. At the mesoenvironmental level the discussion has frequently centred on *which* technical solution to adopt and how best to provide an infrastructure to support this. At the microenvironmental case level the emphasis has often been on how to implement the technology so that it can work with, rather than replace, existing practice. Given that technically-mediated reuse represented a shift in practice during a period when technology adoption in UK HE was changing rapidly in form and function, these micro- and meso-environmental emphases were understandable. Many different technical approaches have been adopted, as the cases illustrated.

Activity described in Chapter 3 concerning the progress in development of standards for learning objects, metadata and learning design, suggested that perceiving barriers to reuse in technical terms and addressing these through technology, or technical remedies, was well established by the start of the research period. They supported a deterministic view of reuse which assumed that problems could be expressed as technical issues and addressed through

specific solutions (technical) with reuse automatically following, or at least more likely. Thus the challenge of ensuring that resources would work in new contexts and combinations was addressed through design of a new resource type (the reusable learning object) with technical interoperability standards. The difficulty of identifying suitable resources from multiple sources, without prior knowledge of their existence, was addressed through metadata and improved search facilities. The challenge of IPR impeding reuse was, towards the close of the period, addressed through the shift to adopting open licenses. These were all technical solutions to reuse which viewed the barriers to reuse as technical problems.

The vision of reuse of digital online resources as an effortlessly effective activity, replacing conventional educational practices, has often been informed by educational technologists (e.g. Downes, McGreal, Koper) who articulated clear plans for widespread reuse in technical terms. Other educational technology researchers (e.g. Wiley, Littlejohn, Boyle) suggested that reuse of digital online learning resources required a more negotiated technical approach. Shifts in pedagogy have resulted or been necessitated by employing technical approaches to reuse, for example the adoption of new forms of narrative or assessment in CS1-H806 (Weller, *et al.*, 2003b). As the UK HE reuse mesoenvironment has matured, there has been increasing recognition of the complex nature of reuse. For example, repurposing has emerged as a common approach to customising reused resources to meet the educators' preferences, rather than anticipated reuse 'as is'. The comments raised in case interviews and observations reflected interest in quality and motivation factors when deciding whether and what to reuse. This suggests why there has been limited progress in the automation of reuse within UK HE.

The JISC, a technically innovative body with a technological remit, was the primary funder of digital repository and reuse projects in UK HE during the research period. This led to a succession of projects which had emphasis on addressing the technical barriers to reuse, and

often focused on technical approaches to resolving these. As a result, the sector is now well placed *technically* to engage with reuse of digital online resources.

The cases provided evidence that technical problems, or simple uncertainty about what the technology set-up *would be* (e.g. CS1-H806 and CS4-SORRS), could obstruct reuse behaviour, or force it down particular routes. Technical (including legal IPR) issues were mentioned as factors in several cases and rights issues have been noted as a factor affecting reuse facilitation more widely (Earney, 2009). Although there is some overlap in classification of technical and motivation factors, there was no evidence from the factors recorded, apart from CS1-H806 (where learning objects had operational and pedagogical impact), that better technical tools, systems or approaches act as a *motivator* of reuse.

Technical factors in reuse, as in other aspects of educational technology, more clearly displayed their potential to act as a significant barrier than as an enabler. This may reflect the techno-scepticism of many HE teaching staff. If the technical features (i.e. technology and IPR) did not provide a user-friendly experience, this could discourage or halt engagement with reuse. Within the educational technology community, there may be attraction to using a specific technical solution for research purposes, as a condition of project funding, or as part of wider technological change within the institution. However the examples studied in this case research, do not suggest that technically-enabled reuse activity would be sustained by non-project participants without additional drivers or benefits. Project funding was often directed at discovering whether a particular technical approach would work rather than suggesting that it would.

Herzberg (1968), writing on job satisfaction, suggested a classification system where some factors could be described as motivators and others operated as 'hygiene factors'. These two

types of factor acting independently. Hygiene factors, such as the minimum requirements of the physical working environment, if not addressed, would prevent satisfaction. However, additional improvement to these would not raise satisfaction in the way that enhancement of motivational factors did. The comments on technology collected suggest that if poor, or inappropriately applied, technical factors can stop or slow any uptake in reuse. As Casey (2008) noted, when talking about IPR, this could act as 'lightning conductor', a focus for attention and anxiety. Resolving specific technical problems may allow reuse to occur where motivation to reuse exists, or where resource quality is appropriate, but improvements beyond the threshold of sufficient user-friendliness, speed, robustness, etc. do not appear in themselves to prompt, or motivate reuse. Where reuse did appear initially to be linked to technical factors alone (e.g. CS1-H806 in its use of learning objects) on closer analysis this appeared to be informed by quality and motivation factors also. There were also additional overarching modifiers relevant to that case in terms of the context (distance education) and emphasis on local sharing (i.e. the proximity of creators and users). Technical factors could be 'hygiene factors' in terms of reuse, rather than motivators.

The cases provide examples of teaching staff aware that reuse, and its technical supports, could save them time in the future, but being unable or unwilling to adjust their behaviour by learning how to apply metadata or create and maintain generic resources (CS4-SORRS). As the technologies that support reuse become more standard and familiar, for example as the same repository systems used for research become used for teaching, and tools consistent with social networking are employed (e.g. CS3-LORO), the technical process for potential users may become less onerous and more enjoyable, motivating engagement with it.

One interpretation of the relative lack of diversity in the technical factors identified through the cases, is that the technical problems of reuse were already well understood and were largely addressed. This was not the case for the other two classes of factors.

7.2.2 Quality class of factors identified in reuse and repurposing

As already noted, quality was the second largest of the three categories in terms of diversity. These factors referred to quality of both the educational resource, and the way in which the resource was offered (but did not refer to the quality of purely technical aspects). For example 'RLOs encourage external linking which speeds reuse (migration)' (Insert 7.1, factor 15) refers to improved quality to the technical process for developers rather than educational use.

Factors noted in this category included ability to assess the quality of the resource and also how others could judge the resources shared (e.g. 'Comments are preferable to simple ratings', Figure 7.1, factor 69 (LORO)). Other quality factors commented on by participants in the cases usually related to the quality of the *resource* rather than quality of the *system*. This may reflect that the services were not yet operational within some cases, but offers contrast with the range of technical factors identified, where emphasis in comments was usually on the system, tools or technique (e.g. CS1-H806 – RLO creation) rather than on the resource.

Some of the most compelling reasons suggested at a mesoenvironmental level for sharing and reusing online digital resources emphasised the potential to create higher quality resources than would be possible otherwise (e.g. Downes, 2001)). The control of resource quality varied across the cases. Some used approaches where there was a high degree of centralised control over the selection and format of what was shared, with central quality checks (e.g. CS2-Stòr, CS3-L₂0 and CS4-SORRS). In others there was a lower, user-controlled, threshold of quality, apparently to encourage direct user engagement (e.g. CS3-LORO, CS5-PROWE and CS6-NDLR).

The question of on-going quality was also raised around maintenance plans of the resource. In some discipline areas such as Health, e.g. CS2-Stòr and CS4-SORRS, (Quentin-Baxter, *et al.*, 2010) updating may be more significant as a quality indicator than it is in others. Comments from the less formal cases (e.g. CS3-LORO, CS5-PROWE) suggest that sharing resources for review, or to influence others, need not require the same quality standards as offering resources for showcasing, e.g. 'Sharing work that is not "best work" can be beneficial' (Insert 7.1, factor 69).

The factors noted from the cases, illustrate that there were several different strategies for determining what is appropriate quality for sharing and use within the case microenvironments. Repositories may control the selection of the resources offered and determine format and other attributes including accessibility (e.g. CS2-Stòr). Alternatively they may facilitate contact between depositors and users, encouraging feedback in order to improve quality (e.g. CS6-NDLR). A more laissez-faire approach centres on ensuring the quality of the metadata description leaving users to decide the quality of the resource (e.g. Jorum). Each of these options requires a support team in place to manage quality as an on-going process.

For users, the judgment of quality appears to be user/use-specific and thus a subjective process, whether applied to online resources or the systems that offer these. The potential or actual user of the resource is the person best-equipped to evaluate the appropriateness of quality. Their judgement may however be affected by their approach to practice and skill level. Also, as CS5-PROWE demonstrated, assessing quality can be highly complex where there are no clear boundaries to what and also who is sharing. On most occasions where resources are being viewed and selected for download reuse does not occur (McAndrew and Lane, 2010 and Davies, 2004) and no specific use context may be in mind. Although the user of the repository

is likely to be the educator, and this user is the one on which this research focused, the 'end-user' of the resource will often be a student. The educator is usually selecting appropriate quality on behalf of their learners as well as based on their own preferences.

The quality required will vary with the form of use, even where the user remains the same. As STOR B noted in CS2-Stòr, if an educator-user wished to find things that might influence or act as starting points for thinking, Google offered a faster way of quickly 'reusing' than accessing quality-assured resources in a repository on an item-by-item basis. The quality of Google-derived resources was recognised as poorer in many respects, but access speed was an important quality in this example, acting as a hygiene factor within a specific reuse context.

Many users, particularly when selecting resources from less formally-controlled repositories, referred to the provenance of the resources (i.e. its origins) as a filter employed when assessing quality. This may be determined by a brand such as MIT (or the OU in CS5-PROWE), or the identity of the creator(s) (CS1-H806, CS5-PROWE, CS6-NDLR). As PROWE E (2007) noted, there may be attraction to a recognised name, a source of previously useful information. Where the creator of the resource is not known to the potential user, reference to profiles or to metadata (which in fullest form could be contextual and/or secondary metadata) may be used with the objective of establishing provenance.

The user may also assess quality in ways which require specific repository features. For example, they may preview the resource, refer to rankings and comments by other users or to peer reviews (e.g. MERLOT), use indicators of popularity (e.g. number of downloads (as available in CS3-LORO)), or note the date created and review/maintenance pattern. Users may make assumptions about quality from the type as well as the origin of the resource, e.g. 'Multimedia is a sign of quality, and lack [of this] a sign of datedness' (Insert 7.1, factor 87).

There was overlap of technical with quality, and also with motivation classification. Factors which spanned these categorisation boundaries suggested that both the technical environment and the motivation for reuse could affect, or be affected by, requirements concerning quality.

7.2.3 Motivation class of factors identified in reuse and repurposing

The third part of the classification, motivation, was a particularly diverse one. It emerged in recognition of factors and issues indicating the purpose for which a resource was acquired, or reasons why it was shared. As with the other classifications there are two aspects to motivation factors. These can impact on the type of resource which is shared, for example leading to selection of open or more restrictive licenses for resources. They can also impact on the resources selected (or rejected) for reuse, for example favouring those developed for face-to-face teaching rather than those developed for use online. The motivation can be affected by who or what is *driving* the reuse activity. Reuse could be part of funded-project activity, with externally imposed conditions, an individual experiment (e.g. the tutor blogs referred to by PROWE G (2007)), or part of institutional strategy (e.g. CS4-SORRS).

As noted in Section 2.4.2, a variety of resources is required to meet the challenge of student diversity, where one size does not fit all needs (Miliband, 2006). The same dictum could be applied to educational resources directed at staff. The cases revealed personal objectives in sharing and reuse and a variety of preferences concerning what reuse activity would achieve and how it would be maintained.

While wider political and institutional motives to engage in reuse were identified in Chapter 2, the individual educator's reasons for reuse within specific contexts may not be articulated or recognised in advance or can be subject to change. The motivation of individual users may be

assumed to coincide with those of the institution, e.g. potential future time saving (CS4-SORRS), access to accessible or multimedia resources (CS2-Stòr), or exposure to a wider range of resources or practices. However, CS4-SORRS identified how an institutional requirement to support reuse may motivate, or de-motivate. While on-going maintenance of a resource shared in SORRS, was seen as a disincentive to sharing, relinquishing that responsibility was seen as a possible reason to engage. The juxtaposition of reuse with wider objectives to support curriculum, institutional or even national change can add a political dimension to motivation or resistance to reuse. If, like Noble (1998), the educator is averse to online learning, there is no reason to believe that s/he will welcome resource reuse if this is directed at increasing migration to online or blended teaching and learning.

Cialdini (2007) writing on influence and persuasion, suggested that changing a person's behaviour can be achieved through six strategies even where the activity was not intrinsically valued by the participant. This suggests that the way in which the advantages of reuse are represented could influence engagement. His six strategies could be applied to reuse as:

- **Reciprocity:** engaging in reuse to return a favour;
- **Commitment and consistency:** requiring a formal commitment to reuse;
- **Social proof:** reusing because peers are seen to do this;
- **Liking:** reusing because the request arises from someone who is liked;
- **Authority:** reusing because a respected authority figure requires this;
- **Scarcity:** reuse because there is an exclusive or time-limited aspect to the activity.

The cases provide examples of user engagement with reuse promoted through arguments based on commitment and consistency, authority, and scarcity. For example, increasing the supply of shareable, scarce, multimedia resources has been argued to be a driver of reuse, with emphasis on reaching a critical mass, a fully-stocked store of reusable resources to entice custom. In CS5-PROWE, there were indications that sharing was influenced by reciprocity,

social proof and liking although these were insufficient to sustain engagement with a system which, being project-based, was only temporary. Participants in the cases, as Insert 7.1 (oversize insert) shows, indicated that lack or uncertainty around reward or recognition, had an influence on reuse and directed the form that this took. For example (from CS5-PROWE): ‘University reward system does not reward wider sharing beyond the institution’ (Insert 7.1, factor 177), ‘Most users don’t fill in metadata, there must be some reward for doing it’ (Insert 7.1, factor 179).

The blending of community of practice and repository within CS6-NDLR provided examples for sharing and reuse which allowed the project CoPs to offer immediately realisable benefits to the individual (e.g. NDLR Biotechnology CoP, 2008) (Section 6.5.3) using social reciprocity and social proof as drivers of sustainable reuse-friendly behaviour. Reciprocity may provide an alternative form of reward as suggested in this factor noted in CS5-PROWE: ‘Disappointing level of comments – comments as reward for contribution’.

7.3 Two cross-case modifiers

The *context* for the reuse (sharing or use) was shown to influence, or modify, the type of technical set up required, quality considerations and the motivation for reuse. Two cross-case modifiers related to context were particularly evident in these cases and are explored in more detail below. These conclude the view of the research quintain based on cross-case analysis.

7.3.1 The effects of distance learning on resource reuse

Of the six cases examined in Chapters 5-6 only one was wholly internal to the Open University (i.e. with no external partners). However, the OU was lead partner in two others, and five of the cases had, or have, some connection with the OU. In comparing cases, and in particular in suggesting generalisable themes and concerns arising from them, some consideration needs to be taken of particular attributes of the OU. This may have affected institutional and individual motivation to engage with resource reuse and also expectations or constraints when reuse facilitation was attempted.

The OU is not only the largest UK HEI, it is what Daniel (1996) described as a *mega-university*, exceptionally large (260,000 students and c.7,000 teaching staff in 2012). It is also distinctive in being a distance learning (DL) university with most teaching occurring at a distance from the students. Both the scale and the DL activity influence resource production and reuse and are atypical within the context of HE.

There are a number of context-specific factors which appear to make the Open University more open to facilitation of reuse (particularly sharing for reuse). In much the same way that RLOs were anticipated to predispose to reuse, the OU was a context in which reuse might be considered more likely to happen. The reasons relate in part to the nature of distance learning activity. Whether the context for production is a distance teaching institution can act, where the HEI is large scale, as an overarching modifier on the potential for reuse to occur and be maintained. That reuse may occur within or beyond the DL HEI.

Distance education institutions such as the UK Open University are often associated with teaching innovation – experimentation with new and novel teaching approaches, including educational technologies. There was, when established in 1967, no tried and trusted method

of distance teaching on which the OU could reasonably rely. Hence its original mission statement was to be 'Open to people, places, ideas and *technologies*'. The OU has a history of using broadcast technologies such as TV and radio which made its innovative teaching visible to others. Most recently it has engaged with online delivery as a means to deliver core content and activity and the cases connected with the OU (CS1-H806, CS3-LORO, CS4-SORRS and CS5-PROWE) addressed online module delivery.

Distance teaching in contrast to campus-based teaching has traditionally relied on the production, and reproduction, of tangible resources for students, e.g. printed study guides and units, audio and video recordings. These replace face-to-face lectures or tutorials and create a persistent product, one which can be inspected, copied and adapted. These products are designed to be reusable across a number of course presentations and can be shared with others even after the course ends. In contrast, face-to-face lectures and tutorials are *perishable products or services*. Like a performance at a theatre, unless recorded, only some elements of the lecture are available for reuse. There may be slides or handouts, which like the theatre programme, may not offer an accurate or full representation of the activity. Shifts to teaching online at the OU and elsewhere in UK HE have created new opportunities to capture teaching activity and allow its reuse asynchronously. Online learning and teaching has led to a convergence of distance and campus-based teaching approaches, but this usually occurs in blended fashion (Littlejohn and Pegler, 2007) and has yet to become the main approach of teaching resource production within UK HE.

In addition to the form of resources produced, the OU also follows different practice in how resources are distributed to its students, creating opportunities for use by learners and educators beyond the institution which are recognisable as reuse. Until the start of the 1990s, when recorded versions replaced TV and radio broadcasts, the 'University of the Air' used

public radio and television (the 'airwaves') to teach its distributed students. The public nature of this dissemination channel made OU teaching accessible to large numbers of viewers beyond the students registered on its courses. This 'reuse' by informal learners outside the OU system is analogous to recent OER initiatives such as: MIT's OpenCourseWare initiative <http://ocw.mit.edu> (sharing audio visual recordings of lectures), Oxford University's podcasts on iTunesU <http://itunes.ox.ac.uk> , and the OU's own OpenLearn <http://openlearn.open.ac.uk>.

The OU's adoption of analog broadcast technology as a teaching channel was possible because of the exceptionally large scale of the institution, with teaching resources being often shared across thousands of students within a single course. This huge scale also made feasible the production of durable, high quality, illustrated course units and readers. Copies of these texts and of OU audio visual recordings, were used by other HEIs as library or teaching resources. Co-publication arrangements with commercial publishing houses led to popular OU course texts being available for non-OU educators and students to purchase within bookshops without registering on courses. A second-hand market for OU course units existed through classified adverts in the student paper and has since shifted to eBay to reach a wider market. It is possible to purchase all the offline resources for an OU course, excluding tutor support, assessment and accreditation.

This wide access and assumption about reuse (replay or reprint) of resources across multiple presentations had led to unusual practice in how teaching resources are created at the OU. Within other institutions there is usually expectation that these resources will have a limited audience: the teacher and students. Some teaching resources will only be seen or referred to by the teacher. Although placing content within VLEs theoretically makes teaching resources visible to others, the permissions structure used limits the audience to a specific group (often

only a specific teacher and class). As Lee (2008) pointed out, the gates of the campus-based university remain closed, what occurs there is not usually visible to others.

Even where OU teaching materials have no obvious external audience (i.e. are not available as OpenLearn OER or part of a co-published text) they will be visible to a large number of teaching staff. There is no single teacher of the course within the OU system as student support and assessment is carried out by teams of Associate Lecturers rather than the designer(s) and author(s) of the resource. If educational resource reuse is defined as use, for teaching, by someone other than the creator, then all OU ALs are engaged in reuse and all OU academic authors write for reuse. As tutors within the CS5-PROWE case noted, they had little need to create their own resources. The core materials they used to teach were produced for and supplied to them.

Teaching in campus-based institutions is not normally visible to peers, with the exception of scheduled teaching inspection visits, which usually serve a developmental, rather than resource or practice-sharing purpose. Across the six cases studied, resource sharing for reuse outside the OU assumed that support would be required for creation of suitable resources (CS2-Stör, CS3-L20 and CS6-NDLR). However, amongst the OU-centred cases (e.g. CS3-LORO and CS5-PROWE) the resource sharing was considered an extension in scale of resource sharing which already occurred intra-institutionally. The OU exception was CS4-SORRS, which required the resources to be created in a generic format, although the basis of this repurposing was light adaptation of content that had been written for OU courses.

From the start of their careers as distance educators, OU central academics are aware that they are creating a visible product subject to review and comment by others and to be used by educators and students who they may never meet. Even when writing drafts of resources,

there will be an audience, including: other members of the course team; critical readers; and internal or external reviewers. As the course moves from production into presentation this audience extends to ALs as well as students. This difference in visibility to inspection by peers has long been recognised as a significant difference connected to distance teaching. For example, Jevons (1987) writing about Canada's distance teaching university (Athabasca University) pointed out that DL teaching was exposed to additional quality assurance through awareness that teaching content to be reviewed by peers. Creating resources for reuse by others, and being aware of the potential of local adaptation of these by tutors, is normal practice within distance teaching institutions. Because of the scale of its teaching, the OU produces resources which are reused by thousands of educators (ALs) each year.

Finally, because it is itself a publisher of content, the OU enters a different arrangement for rights management and rights clearance than occurs within other HEIs. The OU cannot rely on fair dealing and CLA licenses in order to produce copies of material, although these are adequate for most other HEIs. The OU has needed to clear rights directly with the rights owner, in order to incorporate resources created by third parties into its teaching. An expert in-house department provides this service and since 2000 has, as a default, cleared digital rights globally. This ensures that the OU can reuse its resources in different contexts, without re-clearing the third party rights for materials embedded within them. The OU is therefore technically more prepared for resource reuse than other institutions, and OU authors anticipate reuse from the start. In other HEIs authors will usually not anticipate reuse when creating the resource. This has implications for the presentation style, quality of finish, rights clearances and ease of reproduction. Reuse is not automatic or easy, even within the OU, as the CURVE project illustrated (Section 3.4), however it is embedded in the OU's normal operational practice.

This preparedness to publish explains the OU's enthusiastic engagement with OER through OpenLearn, which could be viewed as the newest manifestation of its open broadcasting past. The integration in 2009 of OpenLearn with OU activity in iTunesU within the portfolio of a Director of Multi-Platform Broadcasting suggests that this view is plausible. Operational changes at the OU to adopt structured authoring (referred to in CS4-SORRS) and automated OER generation for OpenLearn, will make the process of reuse at the OU *technically* even easier in the future.

As other UK HEIs adopt teaching approaches which require online publication of resources and activity there may be increasing awareness of the potential for reuse and review beyond the intended audience. This could move other HEIs towards the OU in terms of preparedness to share resources, the first stage of reuse.

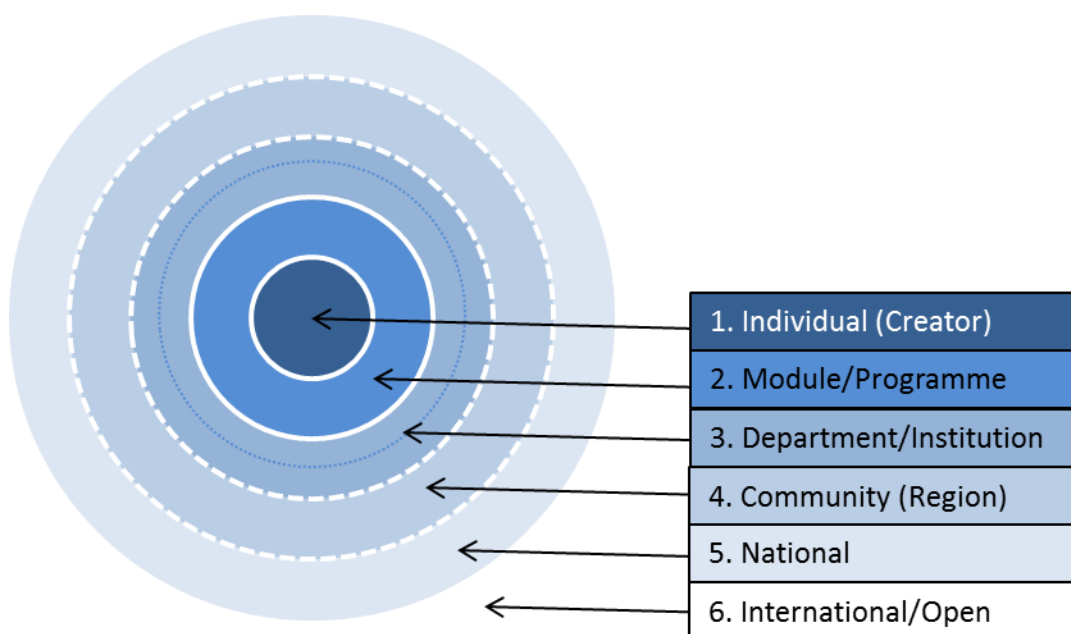
7.3.2 The significance of 'proximity'

Not all the cases studied were ones where reuse was feasible within the timespan of the research, however CS1-H806 presented several, apparently unproblematic, examples of extensive reuse within a relatively short timeframe (Section 5.3). Compared with other cases this was an exceptional level of reuse and achieved quickly in a usually slow production context (Section 5.2.1.6). While this has been attributed in part to technical factors involved in this case, i.e. the use of RLOs, and the production of the resources within an OU DL system favours reuse (Section 7.3.1), it could also be associated with the close connection between the users and the sharers of the resources. For these resources the sharers and users were the same people, or members of the same small team.

As the relationship between the sharers and users was a theme commented on across several cases, it is suggested that the proximity, i.e. distance, between sharer(s) and user(s) may be a

cross-case modifier acting on reuse. To represent the proximity and distance ‘boundaries’ represented in the cases, Figure 7.1 illustrates six ‘proximity zones’. In this schematic the zones are shown as concentric circles, with each circle representing a level of connection between the participants in resource reuse (i.e. suppliers and users). The form of the illustration should not suggest that the zones represent equal size or are evenly distributed. It is meant to represent how different zones appear to ‘nest’ or operate within others.

Figure 7.1: Six zones of reuse proximity



As with other factors affecting reuse the proximity level (or zone) can apply to the activity of *supplying* resources for reuse, or the *using/reusing* these. Figure 7.1 shows the passage from one zone to another as crossing a clear boundary, representing an identifiable change in the relationship of resource producer and user. The shift from zone 1-6 could be described as a decline of proximity, or growing distance, between creator and user. In practice the move towards more openness, in releasing resources for wider reuse, makes later retreat to a more restricted position impractical. For example, once resources are available under open license

to an international audience reuse of that version cannot subsequently be effectively restricted to a national or institutional zone.

The zones range from individual (creator) reuse (as in CS1-H806), to sharing internationally which was also subsequently evidenced in CS1-H806 (Section 5.3.4). A drift towards openness over time was also seen in other cases (CS2-Stòr, CS3-LORO and CS6-NDLR). Since the focus of the research was within UK HE, sharing internationally was not specifically represented within the case selection, however as Figure 7.2 shows there was a trend towards openness, or wider reuse, for all except the departmental repository CS4-SORRS.

Figure 7.2: Drift towards declining proximity represented by the cases

Case	H806	Stòr Cùram	SORRS	PROWE	LORO	NDLR
Start*	zone 2	zone 4	zone 3	zone 1	zone 3	zone 5
Close*	zone 6	zone 5	zone 3	zone 4	zone 4	zone 6

** The Start and Close positions refer to the position of these cases at the point at which the project started and relates to its stated aims at this stage, and where they were at the close of research in April 2010.*

Although there is a geographical dimension to the labels applied to the zones, with ‘national’ and ‘international’ used to describe the two widest ranging zones, the zones do not necessarily denote distance or proximity in a geographical sense. Exchange of online resources does not usually recognise geographical boundaries.

The zones represent progressively more 'distance' between the creator and user as they radiate outwards. The case studies suggested that different issues arose when moving from close proximity (where the creator and user may be the same person) to lower proximity, where participants are less likely to be familiar with the same work or contexts. For example, the level of metadata required to describe resources at the national repository level (e.g. CS2-Stòr), where the participants are unlikely to be close colleagues, was different from that required to describe resources exchanged within the same institution (e.g. CS3-LORO).

The closest proximity exists where sharing and use involves the same person. For this, minimal metadata would be required to facilitate reuse, e.g. titles and dates/versions of documents only, without requirement for resource identification to be usable by others. These will aid search rather than support discovery. Sharing at very close proximity occurred within CS1-H806 reuse activity (Section 5.3), but was also noted as an objective by participants in CS3-LORO and CS5-PROWE (where it was mentioned at both OU and UoL sites).

Each zone is assumed to include the zones nested within its boundary. Thus, international sharing also includes sharing nationally. Sharing nationally can facilitate sharing within a region or community (e.g. discipline group) as it includes those boundaries. Open sharing (e.g. as OER) equates with international sharing and has no obvious boundaries of association or geography. Reuse within a proximity zone is assumed to reflect equivalent dissemination about and availability of the resource. For example a nationally shared resource should be discoverable and available nationally. If potential users are unaware of the resource and it is not possible for them to learn of its existence, a lower level of proximity applies (e.g. institutional).

Sharing within communities appears to present a special case, as these are more fluid and the operation of the boundaries is not so definite. This zone is therefore illustrated with a more

permeable boundary than others. This recognises that communities of practice and disciplinary groups may be international and in some regions can be trans-national. The UK is itself a trans-national region (as noted in CS4-SORRS). Sharing within the UK would be represented in Figure 7.1 as sharing 'nationally', reflecting the closeness of the nations (i.e. zone 5, incorporating zones 1-4). It could be argued that when sharing internationally, but offering only one language option (e.g. English), this is a different level of international supply than one which offers or permits translation.

Communities can also exist within departments, operating across a shorter 'distance' and implying closer levels of proximity than the position as the fourth circle suggests. The qualification for access to the resources of a reuse community, and entitlement to use these, appears to be based on membership or engagement with the community rather than being a member of an institution/department, or geographical location. This can result in members of a department or institution being unable, in some cases, to access the resources of their colleagues. CS3-L2O offered an example where community-based sharing occurred as part of a funded initiative focused on sharing within a region. As Figure 7.2 indicated, by the end of the project the community that it engaged with was national in scope and the Language Box and HUMBOX initiatives that followed were national and later became open. CS2-Stòr, provides an example where sharing was based on teaching social work to social work students across HEIs in Scotland. This initial classification excluded teachers within the same institution who taught other subjects (e.g. Law) to the same social work students. It also excluded institutions within Scotland that did not teach social work. Although later becoming a more open service its initial categorisation would be as zone 4 (i.e. community).

Sharing within the same faculty/department or institution is illustrated as sharing within the Zone 3. There may be barriers to entry from department to institution. For example, in CS5-

PROWE the UoL part-time staff could access departmental resources but not the full range of institutional resources, which included resources held by different departments. However, being intra-institutional, the barriers between these two proximity layers are lower than in other cases and more easily breached. For example, the systems are more likely to technically interoperate and the terms used to describe resources, tools and courses are likely to be recognisable to users. The separation of department and institution is therefore shown as a dotted line.

Movement between zones need not occur as a sequential progression through the intervening zones. A resource creator can respond to a request to share resources via an international mailing list, or post into the JorumOpen repository and move immediately to the sixth zone. However the more complex the resource in terms of third party rights, the more difficult this becomes. IPR may limit sharing beyond the institution, or even discourage sharing beyond the individual.

Although the owner of the copyright in the resource (usually the creator of the resource) is the only person who can *legally* make a resource shared restrictively more 'open', anyone who has access to it could make the resource more widely available once it moves beyond zone 1. They could do this through referring and linking to it (if it is available on an unrestricted site), by quoting from it under the educational arrangements mentioned in Chapter 2, or they can simply distribute, or upload, their copy of the resource to allow others to gain access to it. In some cases the institution will own the copyright in the resource, by local agreement or because the resource was made during the 'normal course of employment' (HMSO, 2011). Resource reuse beyond zone 1, both sharing and use, can occur formally or informally, without reference to the wishes of the owner of the copyright in that resource. Legally this is not permissible, but technically and practically it can and does occur (White, 2011).

Figure 7.2 shows how the scope of sharing migrated formally within the six cases over the research period. The case resources shared were substantially the same, although the process of sharing in a different zone may have required additional activity (e.g. changes in licenses or metadata, translation into a different language, or migration to different online systems). As noted in CS5-PROWE, moving beyond zone 1 level sharing is likely to require additional effort. This could discourage proactive sharing. Motivation to reuse or share could be anticipated to be strongest where the proximity is highest, as the benefits of reuse are realised by the staff expending effort in creating and sharing resources, or by their colleagues/community.

As the zones progress from 1 to 6 the diversity of the resource sources (creators) will increase while the range of resources from each source decreases. At zone 1 there is only one creator of resources, and 100% of that creator's resources reside within this zone. Most resources located here, e.g. drafts and working plans will never be made more widely available. At zone 2 and beyond there are more people involved in sharing or reusing. There is also a degree of selectivity (compared with zone 1) in determining which resources will be shared. For example, Margaryan, *et al.*, (2006) reporting research within the CD-LOR (Community Dimensions of Learning Object Repositories project) found that 87% of respondents shared at least some educational resources at the stage of being work in progress. This indicates that 13% do not share *any* work in progress. What is not known from that research is who these users shared progress versions with and how proximate those were. In CS5-PROWE, participants PROWE F and PROWE G are happy to share even 'fuzzy' work-in-progress, but they identified each other as co-located colleagues working within the same region on joint projects. Others in the same project were more circumspect, even when talking about finished resources.

Decisions on what to share, and who to share it with, are important to understanding reuse of digital online resources. Moving outwards through the zones from 1 to 6 requires a greater

level of trust between creator and (re)user. Participants in the exchange are less likely to have prior knowledge of each other, so need confidence in the description of the resource. Users must usually take on trust technical information provided (e.g. the clearance of, or non-existence of third party rights within the resource). The resource creator must trust users not to abuse any controls that have been set in place, e.g. by failing to acknowledge rights or not respecting restrictions on reuse.

The examples of proximity illustrated here, drawing on the case studies, suggests that although increasingly easy to overcome technically, weak proximity between creator and user in dissemination and discovery of reusable resources may increase motivational tensions as well as the challenges of agreeing appropriate quality. With digital online resources structured for reuse and licensed as OER, many challenges to widespread resource reuse have been addressed. However reuse within a relatively select community where trust, shared vocabulary and common systems exist remains easiest to achieve in the short term. That local sharing may, as these cases suggest, pave the way for wider sharing as Figure 7.2 suggests.

Chapter 8: Conclusions

Review of the six microenvironments (case studies) suggests that sustainable technologically-mediated reuse was not well demonstrated in UK HE within the research period, with the cases collectively illustrating the complexity of reuse activity and its facilitation in practice. Part of the explanation for slow progress towards resource reuse lies in the dual aspects of reuse (sharing and use) present, with different participants and diverse factors affecting what are often separate processes which require alignment to result in reuse. Where resource sharing crosses several proximity zones (Figure 7.2) different participants and drivers may also operate at each stage of the reusable learning resource lifecycle (Figure 1.1). Reuse 'as is' was shown to be less common in UK HE than repurposing. The potential to repurpose is a significant affordance of digital and online resources which can be altered more easily and can be discovered and utilised more readily. However, repurposing is antithetical to reuse automation, which assumes that ordering or substitution of stand-alone resources (objects or assets), i.e. variation in design, can provide sufficient variety to meet users' needs effectively and appropriately. One difficulty arises because online educational practice in UK HE, and elsewhere, is not yet well supported by practitioners who have online course design skills.

Comparison of the cases suggests that factors relating to technical, quality and motivation need to be addressed for reuse to occur. While determining the appropriate mix of these factors is context-driven, some contexts appear to make reuse more likely to occur e.g. large distance teaching university contexts (Section 7.3.1) and where sharing is based on close proximity (Section 7.3.2). Reuse within these relatively favourable environments was already established at the start of the research period without reliance on technically reusable formats. However these styles of reuse (e.g. 'reuse' intra-institutionally by part-time tutors, or

reuse by resource creators) are not usually identified as optimal reuse of online resources. The success in reuse in CS1-H806 suggests that technical formats for reusable resources, e.g. RLO and OER, and appropriate systems for accessing these, when combined with expertise in online course design and appropriate context can generate and respond to unexpected reuse opportunities. While Figure 7.2 suggests that sharing in reusable technical form in the cases exhibited shift towards wider sharing, it is difficult to predict whether sharing once commenced will broaden in scope over time, thereby embracing more reuse opportunities or changing the nature of reuse opportunities. Tracking reuse activity is problematic where this activity is not proximate (Section 7.3.2), the timescales to achieve reuse may be longer than anticipated and the types of reuse may be different from those expected.

Emphasis on the desirability of achieving a higher level of technically-mediated reuse continues, increasingly centred on OER activity, often with emphasis on developing sustainable practice and viable business models. At the macroenvironmental level there is growing political awareness of OER internationally, associated with benefits for formal education and educators and also for global non-formal learning. Reuse of OER is frequently suggested as a means to address inequalities and financial constraints across a broad education spectrum. It may also be associated with transforming teaching practice (a common underlying theme within the six cases). US Under-Secretary of State for Education, Martha Kanter (2011) emphasised access to and reuse of OER as an antidote to what she described as a cookie-cutter curriculum within US school education. She strongly supported the US Department of Labor's linking of OER sharing to its \$2 billion grant funding of the Trade Adjustment Assistance Community College and Career Training programme, seeing this as part of a wider political movement to ensure that publicly funded resources should be widely accessible for reuse. Kanter's speech emphasised the high level of political significance that reuse of educational resources has attained in the past decade and its potential within a common curriculum, which although unusual in HE can

occur in large cohort teaching (e.g. CS3-LORO). Her emphasis on the creative potential in reuse, rather than simply the cost-saving, is an optimistic note on which to conclude a thesis which has sought evidence of, and understanding of, the wide implications of resource reuse facilitation.

There has been increasing alignment and communication across the macro-, meso- and micro-level views around resource reuse as a desirable objective, particularly in the US. Comparing the six cases, those which originated later in the period had most success in attracting use and influencing practice. They were able to benefit from better technical solutions (both technology and licensing arrangements) and practice-informed research into reuse in UK HE. For example CS3-LORO drew on the evaluation of CS5-PROWE, which preceded it, as well as the earlier work of L₂O (an earlier part of CS3). Many UK HEIs were by 2012 aware of the potential of OER activity, with fresh incentives to engage in reuse activity, as a result of the UKOER programme (JISC, 2008). UK HEI involvement with broader initiatives such as iTunesU suggests that sharing resources globally could provide positive benefits to both institution and individual academics (Highton and Robinson, 2010), although the incentive to engage with OER may be allied to marketing and dissemination opportunities rather than reuse (Beggan, 2010). While there is enthusiasm within developing countries for OER (Mason and Rennie, 2010), and significant OER activity beyond HE (e.g. open textbooks for US schools to save costs and improve student access to these resources (Wiley and Hilton, 2011)), the cases showed a relatively slow build up to reuse adoption where this was an externally-initiated activity linked to practice change. Planned, proactive, inter-institutional resource reuse within UK HE is not yet a mainstream practice.

The cross-case analysis in Chapter 7 underlined the complex challenges reuse can present to operational, pedagogical and cultural aspects of UK HE. While there has been considerable

progress in addressing many of the technical and quality concerns around reuse, there has been little progress on understanding how to motivate reuse beyond funded projects. The question of how to persuade educators to invest time into reuse on a consistent, continuous basis, is likely to be discipline and context dependant. However technically easy reuse activity has become, supported through the networking potential of Web 2.0 tools such as Twitter, LinkedIn, Google+ and through approaches centred on establishing communities of practice to share (CS6-NDLR), there is limited scope to replace currently used resources in practice. Even where the new resource is perceived as better than that it replaces, academics may lack the time to engage in learning how to use it. As CS2-Stòr illustrated, the time taken to simply select a resource for reuse may be unexpectedly lengthy. Expectations of time saving need to be balanced with the practice-informed evidence about time investment required in both supply and use. The mesoenvironmental interest in Massive Open Online Courses (MOOCs) allows application of OER across a whole course, usually by experienced online course designers, showing a potential for reuse which is rarely reflected within conventional courses.

There are few examples of formal reward and recognition to encourage change in mainstream sharing and reuse practice, although Leeds Metropolitan University during 2010/2011 introduced recognition of OER use and release as an optional measure within annual academic performance review (Thomson, 2010). That model may be adopted elsewhere, but meanwhile active engagement with reuse is, unless project-funded, commonly left to the discretion of the individual. As Section 4.3.4 observed, academics are rewarded for sharing and reconfiguring their *research* work in a format (e.g. journal publication) which assists in traditional forms of research dissemination. There is no equivalent process to reward academics for undertaking extra activity to prepare their educational resources for wider dissemination and reuse.

This research addressed three research questions through exploration of a variety of practice contexts. The exploratory case in this research, CS1-H806 informed development of all three questions, providing access over a seven year period, allowing the researcher to identify several examples of reuse inconsistent with those anticipated at the start of the project. CS2-Stòr offered an opportunity to compare the objectives of the service provider with the views of those for whom reusable resources were being created. In CS3-L20/LORO both projects concerned use/reuse of the resources by *educators*, however L20 placed emphasis on establishing a relatively formal model of sharing, with content and metadata quality assured, and consistency in learning design through use of pedagogical templates. L20 resources were ready-to-use by educators, as was the case with Stòr Cùram. In contrast, LORO, based on existing sharing activity within an established community, placed emphasis on repurposing of tutor-shared resources. In assuming that resources on teaching German could be adapted to teach Welsh, LORO project staff anticipated that users would need to adapt resources to a new context by reconfiguring them.

As the mesoenvironmental activity has matured reuse projects have increasingly benefited from prior technical progress, a wider range of reusable resources and better understanding of reuse practice. The LORO and NDLR were the latest projects to get underway and have been the most successful in establishing and sustaining communities of users. This approach was adopted as it became evident that the technical aspects of reuse repositories were in themselves insufficient to drive changes in practice. Chronologically the latest of the cases to start, LORO had a significant advantage in being able to select suitable repository technology off-the-shelf with minimal adaptation. This conserved the energies of the project staff for addressing the non-technical requirements of their users and suggests what may be possible for new repository initiatives.

Although, like CS3-LORO, a departmental repository within the OU, CS4-SORRS project addressed integration of repository reuse into formal teaching and learning systems. It was the only case which was established with the objective of providing direct access to students as well as educators. This informed the controls imposed on the content (which was to be made generic) *and* on the format in which reuse could occur, i.e. without versioning.

The CS5-PROWE project was unusual within the spectrum of repositories reviewed in this thesis and also within wider mesoenvironmental research. It addressed a form of reuse about which little was understood, i.e. the informal and personal exchange of resources and advice between practitioners. It drew together a community of users beyond the normal course or disciplinary boundaries within which such exchanges usually occur and used a new style of informal sharing environment based on Web 2.0 tools (blog and wiki). Although the short-term nature of the project led to experimental rather than authentic use of the system, interviews with users provided insight into how their personal reuse requirements might be addressed through an informal and personal repository system.

The last of the cases, CS6-NDLR offered an example of broad scope (national and cross-disciplinary), with communities of practice providing a focal point from which to support informal and formal sharing of practice, as well as sharing of resources. This approach reflected a fresh solution to the underlying objective of the project-based cases – opening up for reuse examples of teaching practice, as well as supporting resource reuse. This emerging emphasis was consistent with the emphasis in UK HE practice on *repurposing* rather than *reusing* reusable resources, supporting recontextualisation of practice as well as of content.

8.1 Review of case studies and research questions

This thesis set out to address three research questions (Section 4.4) considered here in turn:

RQ1: What facilitates reuse of learning objects in the later stages of the learning object lifecycle?

Comparing the six case studies to better understand facilitation of the later use stages of the learning object lifecycle (*selecting, using, retaining*) highlighted a divorce between these and earlier lifecycle sharing activities in terms of who the participants were. Although technical factors (e.g. licenses and RLO format) were shown to facilitate reuse and create new opportunities for this to occur, use remained an uncertain process. While the *process* of passing from creator to user could be technically seamless, it was not usually observed to happen within the timescales of these cases without some element of compulsion. Selecting in the sense of choosing between resource options for use was shown to be a process which could require unexpectedly large time investment (CS2- Stòr). This differs from selecting for later review and potential or possible reuse, amounting to retention on an 'in case' basis. Neither activity, when use was not already in active consideration, was good indication of reuse later occurring.

An additional area of complexity in identifying effective use facilitation was the timescale over which reuse occurred. For seamless movement to reuse the user needed to become aware of the resource, be satisfied with its quality and have an opportunity to use it, *at nearly the same time*. Alternatively they needed to download and store the resource and later recall that it was available, or otherwise locate it when a reuse opportunity arose. While downloads may occur in expectation of later reuse, when the use opportunity arises the potential user may engage in further cycles of discovery (i.e. a fresh external search) rather than reviewing stored resources.

As the volume and variety of openly shared resources increases further searching may result in discovery of new, more suitable resources.

Three of the cases (CS3-LORO, CS4-SORRS, CS6-NDLR) illustrated that sustainable reuse initiatives, based on changing behaviour, were achievable only over a relatively long time span (4 years+) unless the project (e.g. CS3-LORO) built directly from previous activity. LORO was able to adopt and adapt a tested technical platform. In all cases except CS1-H806, producing reusable resources and/or establishing a service to facilitate reuse took than anticipated. The extensive list of factors noted as affecting reuse (Insert 7.1) suggests that introducing sustainable, wide-appeal, repositories is challenging and a variety of motives, as well as quality and technical factors needed to be addressed. Cases where reuse appeared least problematic to facilitate were those with close proximity between the creator and user (e.g. CS1-H806), or where reuse was part of the normal operation of HEI (e.g. as when tutors reuse OU course materials, CS3-LORO). These are the 'modifiers' described in Chapter 7, others may also apply.

Transition to creation of online digital learning resources during 2003-2010 led to awareness of opportunities and options for online reuse and allowed users to move forward quickly with this. However, how best to facilitate reuse, is determined by user context. For example, the two cases based on sharing in the Languages domain (CS3: L₂O/LORO) and the two based on sharing Social Work teaching (CS2: Stòr Cùram and CS4: SORRS), indicate the effect of disciplinary influences. User repurposing of resources such as photographs is well established practice in Languages teaching (initially offline and increasingly online). However the teaching in Social Work relies on reference to current law and process, with vocational accreditation requirements which can differ on a nation-by-nation basis. This suggests that resources, or assets used in this discipline may have restrictions on the opportunity for user repurposing.

CS1-H806 provided the clearest and earliest examples of reuse and its learning objects were of Category 1 type (Figure 3.1). Although these deviated from some RLO specifications (Section 5.4.1), the H806 technical resource format was considered by the practitioners involved to be the primary reason why reuse occurred and was technically and pedagogically effective (Mason, *et al.*, 2005). The technical efficiency of this reuse may be attributable to the RLO format, but other reasons for reuse facilitation were identified in the case and cross-case comparison. Sharing within proximity zones 1-2 with a close connection between user and creator(s) increased control, reduced communication requirements and improved trust. It also removed the need for discovery or evaluation of the resources reused. Other possible influences on reuse included the appeal of the topic, rather than the format and the reputation of the authors, leading to confidence in the RLO provenance (Section 6.4.4) and to the effectiveness of the learning activity designs. The creators (who were also the resource reusers) may have been additionally motivated by the potential to publish research on the basis of their RLO activity. Through research publications they obtained recognition for their innovatory practices. Although the technical format made reuse more efficient by *facilitating* reuse, the motivation to reuse and reasons why this occurred were complex.

The unplanned nature of the CS1-H806 reuse did not reflect the expectations of the creators. However reuse occurred in part because the resources existed in reusable form. So, although planned resource reuse through pre-versioning (Section 5.2.1.4) did not occur, this example suggests that technically reusable formats facilitated effective and extensive *opportunistic* reuse.

While RQ1 focused on the later stages of the lifecycle, addressing it relied upon effective practice in the earlier stages of the lifecycle (*obtaining, labelling and offering*). Ineffective

practice in selecting appropriate resources, or describing these accurately, could impede the later stages such as reuse.

The focus in the CS2-Stòr service was on: determining suitable sources of resources; ensuring accessibility of the offered resources; and determining the metadata description of these.

These prepared the groundwork for reuse. Emphasis was placed in the data capture suite observations on the later stage of *selecting*, with confidence that the three earlier stages had been effectively addressed. This aspect of the research (Section 6.1.4) identified the effort which could be expended in evaluating resources for reuse. It highlighted a tension between facilitating the *using* stage, by permitting repurposing, while maintaining accessibility of the resource. In order to support preferred style of reuse some relaxation of other standards may be necessary. A further issue relating to *retaining* also emerged. This was the expectation by potential users that online resources would and could be updated by the provider, a belief also expressed within CS4-SORRS.

The two projects which comprised CS3-L₂O/LORO illustrated the shift in assumptions about *reuse* from 2003-2010, with CS3-LORO accepting user-generated content and direct user deposit. Recognising that repurposing would occur suggested a more relaxed approach to quality could be helpful. LORO A (2009) identified a non-OU user of LORO who had invested in a particularly full profile which he used to draw attention to a broad teaching showcase. The additional contextual information provided contributed to the information needs around provenance which participants in CS5-PROWE suggested would be helpful in deciding which resources might be useful to reuse (*selecting*).

CS4-SORRS highlighted tension in institutional objectives for reuse, with emphasis on reuse 'as is', suggesting that flexible options in reusing content by educators may within some

disciplines, be necessarily inconsistent with requirements to offer students standardised, authoritative and centrally updated resources within the same system. How to control undesirable repetition, or minor variation of resources without central controls was unclear. A similar tension to that displayed in CS2-Stòr regarding maintaining accessibility within its resources.

As a case with a personal and informal focus, CS5-PROWE identified reuse that occurred reactively, based on personal needs and contacts. This was activity which already occurred offline and could be facilitated online through safe storage and easy retrieval by user/creators. Having content, including archive, work-in-progress, and not-created-for-sharing resources within a single online space which others have potential to access may facilitate reuse and encourage sharing responsively. It also supports initiation of serendipitous reuse activity.

The desire to know who has created a resource as part of the discovery/selection process, and the importance of the institutional brand, was emphasised in several cases. The importance attached to this in CS5-PROWE may have been particularly pronounced because of the informality of the sharing, without limits on scope of resources or quality control on uploads.

Within NDLR support at one-to-one, community and institutional levels provided contrast with other cases where emphasis was on technical aspects of reuse, with expectation that educators would already have the skill and motivation to reuse resources. To achieve sustained practice change centred on, or involving, widespread reuse of teaching resources and practice may require the level of user support modelled by CS6-NDLR.

Collectively the cases illustrated the high level of support and reassurance required for reuse to occur beyond zone 1 (Figure 7.1), which is where most reuse currently occurs. Although the

context, for example the assurance of longer term access, may influence reuse (Section 7.3.1) the type of teaching activity (e.g. discipline and level of formality) could also act as a higher-level modifier of reuse. Facilitation may need to address formal and non-formal, discipline and audience (e.g. educators, learners or both) requirements. While technical reusability (e.g. RLO or OER forms) can help users take up reuse opportunities, these appear insufficient to generate reuse, particularly within short-term projects, if the type of resources and the qualities of the service do not fit the user context.

RQ2: What models of reuse of learning objects are being explored and currently in operation in UK universities?

The second of the research questions arose from a tension apparent in reconciling the theoretical operation of RLOs (mesoenvironmental expectations) and the practical implementation of these (microenvironmental experiences). This question recognised that incremental shifts in individual reuse, e.g. the creator making more use of his/her own resources mirroring the growth in online access, was of less interest in addressing macroenvironmental challenges than models aimed at sector or institutional change in resource reuse. A number of different models were identified through the cases which, with the single exception of the closely specified CS4-SORRS, each exhibited a drift towards more open models of sharing as the period progressed, with shifts within previously closed models toward openness (Figure 7.2).

The earliest of the cases directed at changing practice, CS2-Stòr, provides an example of this. This provided an opportunity to explore a 'closed consortium' model where access was limited to a relatively small number of partners. These jointly informed decisions about the development of the repository and could also contribute their own reusable resources to it.

Although a national repository, Stòr Cùram had a disciplinary focus and exercised a high degree of central control on content creation, distinguishing it from the UK national repository Jorum. Stòr Cùram quality assured the metadata *and* the learning resources, creating, adapting and setting accessibility criteria for resources deposited, as well as hosting the collection. This commitment may only have been possible for a relatively restricted repository as it required familiarity with the discipline area and commitment of resources on an on-going basis. By 2010, The Learning Exchange derived from the Stòr Cùram project (by then part of IRISS), was an open service, with unrestricted access to the resources. The original reuse model had been much more 'closed'.

By 2008/9, engaging with OER activity at the microenvironmental level was becoming more evident within UK HEIs, representing a new model of activity consistent with less formal pathways to reuse. This included sharing educational resources beyond the HE sector and beyond registered students. In CS3-LORO a mixture of open and restricted sharing within a single space occurred, allowing extension of informal sharing of resources by part-time AL OU staff online (also explored in CS5-PROWE) while retaining a central advantage of LORO as a means of access to core teaching resources. Reflecting the macroenvironmental trend towards openness, CS3-LORO opened itself to the wider international community allowing upload of resources by registered users beyond the OU and allowing sharing under open licenses.

This is not to suggest that non-formal sharing models will overtake more formal approaches, but that reusability in the format of resources can support shifts in reuse models to address new opportunities. Reuse of the RLOs created by the Southampton eLanguages team (the base of CS3-L₂O) continued through the open access Prepare for Success website (<http://www.prepareforsuccess.org.uk/>) on a more open but still formal basis. L₂O A (2009) estimated that 30-40 HEIs (mainly UK-based) linked to the resources. These were directed at

international students hoping to study in the UK and based on RLOs produced for the closed UKeU platform during 2003 (Section 6.2.2). Formal linking to, and use 'as is', such as that used with Prepare for Success, is a reuse model which may be so familiar that it has become 'invisible' as a form of online reuse models. If a resource is available online can be linked to and used free of charge it already has a high degree of openness.

One of the CS1-H806 reuse examples displayed the potential for translation (transnational versioning) when marketing the OU's courses in China. Reuse of resources to showcase teaching within an institution and attract students is one of the advantages attributed to OpenLearn (Lane, 2009) and Open Nottingham (Beggan, 2010). This marketing aspect of reuse could be a driver for institutional OER activity across the sector, although the resources shared are likely to be highly selective and unusually high quality. These resources may be reused within educational settings, or by individual learners acting autonomously, but the primary objective is not educational reuse but showcasing of educational institutions or innovation.

Although CS4-SORRS appears to have followed an unusually restrictive and strategic model of reuse this was the only case which allowed registered students to access and explore a repository used concurrently by teachers. It was also the only case which required integration of a repository into the institutional VLE. Although based on a departmental scale of use other smaller UK HEIs, these were not only challenging objectives, but ones which are likely to become more widely relevant, reflecting influences on new formal models of reuse across UK HE. There were more limits placed in the CS4-SORRS repository on what resources could be deposited, not only in format but in emphasis on establishing reuse opportunities *before* the resources were made technically reusable. This reflects the business case for intra-institutional reuse, which is not reliant upon scaling up the repository in the same way as occurs for broader initiatives. However, as CS1-H806 and also CS6-NDLR indicated, the opportunities to

realise reuse may follow rather than precede the creation of technically reusable resources. CS4-SORRS was the only reuse initiative not to shift towards greater openness (Figure 7.2) suggesting that a precisely specified intra-institutional initiative may be less likely to shift towards openness. This may be grounded in both technical and business reasons.

In contrast CS5-PROWE explored use of blogs and wikis as repositories at a time when Web 2.0 tools were starting to be considered as useful tools for UK HE (White, 2007). While PROWE did not suggest a new model based on Web 2.0 approaches it identified problems in making decisions about quality, and in investing time, where the reuse model is highly informal. All participants interviewed considered that a moderator was necessary, and many expressed concern about who they were sharing *with*.

In UK HE engagement with RLOs has been replaced with engagement with OERs, although the resources being shared may be structurally similar. The wider objectives to change and inform teaching practice efficiently and effectively have been retained in OER activity which has simply removed the need to contact the creator, or clear rights. Models which are open appear more desirable, and perhaps inevitable, when reuse occurs beyond proximity zone 1 (Figure 7.1). This recognises a tension in the models within these cases. Reuse was most prevalent where there had been no business model to achieving this.

The widest spread 'model' of reuse is where the user and creator are the same. While new technical models, e.g. more user-friendly repository systems and licensing schemes, facilitate sharing and use across proximity zones (Section 7.3.2), the clearest model for reuse-based practice changes built on these opportunities was activity led by and involving longer term engagement with communities of practice, e.g. CS1-H806, CS3-LORO and CS6-NDLR,. In each

there were shared interests and motives. To achieve wider reuse engagement with supportive peers and activity informed by discipline focus are likely to be of benefit.

RQ3: What potential advantages other than reusing content does sharing of learning resources, such as learning objects (as defined in RQ1) afford within UK higher education?

As with the other research questions, this one started with a focus on RLO which then expanded to include OER. The advantage of reuse in these case studies extended beyond the benefits of cost and time saving that may have attracted macroenvironmental interest in resource reuse. Indeed, the case studies suggest that where sharing occurs across a broad context (e.g. cross-disciplinary sharing) and several proximity zones, there may be few financial or time saving benefits for those sharing or using. The time and effort required to share in reusable form was greater than expected and the benefits were not obviously relevant to the person investing effort at the time that this investment occurred, e.g. CS4-SORRS. The time and effort expended in using reusable resources was also more than anticipated, in part because of emphasis on repurposing rather than reuse 'as is'.

What was also noticeable was the wider institution, sector or national agenda attached to resource reuse initiatives, often towards greater engagement in online learning. Section 6.3 notes the aspirations of those who established CS4-SORRS for this to inform wider changes. CS2-Stòr was set up with an objective of encouraging changes in practice and knowledge exchange related to a new social work curriculum in Scotland. CS6-NDLR CoPs listed opportunities to improve teaching skills alongside requests to share content, indicating a widespread assumption that practice would be modified with resource reuse, with changes related to sharing of resources, rather than resource reuse, particularly reuse 'as is' (unaltered).

Important changes occur in reuse through the greater visibility that the resource then achieves. Sharing of teaching content and practice shifts this from a relatively private space containing only the teacher and students, into a broader more exposed environment. In CS3-LORO one objective of the repository was to support ALs in using a new online tool, Elluminate. Through the repository they could share examples of their work as their practice evolved, allowing relatively isolated distance tutors to develop new skills together.

Teaching practice is made public with reuse, allowing other practitioners to not only use, but derive ideas from resources offered for reuse. This is an important benefit where the resources are digital and online. They model resource design which is still unfamiliar to many HEI practitioners. There was also a strong suggestion, particularly in CS1-H806, but also in CS3-LORO and CS6-NDLR that having resources available for reuse created opportunities for using these that may not have existed otherwise. By anticipating reuse technically the opportunity to reuse may occur, often through the initiative of individuals familiar with the resource, e.g. the creator or close colleagues.

One of the advantages of sourcing content externally is that this can lead to use of quality-assured ready-to-reuse resources from trustworthy sources, which are better than those created by the teacher in normal practice, thus benefitting teaching and learning. CS2-Stòr, CS3-L₂0 and CS4-SORRS emphasised the importance of single, controlled sources, to maximise this benefit. Within CS4-SORRS linking several courses to a common learning resource allowed consistent updating of references, a particularly important advantage for some discipline areas. Highly structured reuse of this type could ensure that current policy and legal practice was always identified when teaching or supporting students.

CS1-H806 commenced with awareness of possible pedagogical consequences when resources were made as RLOs, e.g. in supporting customisation. Experimentation with new approaches to assessment, and allowing students a choice in their study pathways occurred in this case (Mason, *et al.*, 2005) and would be available to other courses taking this approach. What was also noted in that case was the benefit of reusable format when updating the course after its first presentation. Rescheduling, updating, replacing and continuing experimentation with learning activities and combinations was operationally easier because of the granularity of H806 resources. With blended learning on campus-based institutions replacing and rescheduling resources may not be a particular problem. However, updating based on a granular course structure appears to ease maintenance of online courses, a growing area of activity even within campus-based teaching.

The resources which CS5-PROWE expected participants to share were more diverse than the Category 1 definition of resources (Figure 3.1), including examples of advice and social support, as well as teaching content. The difficulty for new part-time distance teachers of acquiring tacit knowledge about a course, or the practices of teaching online, at a distance, was recognised in this case study as well as in Case 3: LORO. A searchable cross-course repository incorporating Web 2.0 networking tools to support enquiry may be beneficial not only to new tutors at the OU, but to new and experienced teaching staff at any HEI. Social interaction and support centred on sharing content recalls Engeström's suggestion that social networks need objects (Engeström, 2005). Not only reusing educational resources, but reflecting on and exchanging experience around that use, may be glue for online teaching community social networks servicing teachers not only intra-institutionally but inter-institutionally.

While all the formal repositories within these cases had the objective of changing behaviour and sharing practice as part of their remit, CS6-NDLR was notable in emphasising these aspects of the project rather than focusing on repository use. Their primary objective and their clearest progress, was to build communities of practice that link all institutions in the Irish HE sector. This networking has been an advantage connected with, but not dependant on, formal technically-enabled reuse activity. It has emphasised academics' motivation to support and engage in disciplinarity in teaching and built from this, informing new practice through tapping into existing practice and preferences.

8.2 Conclusions to the research questions

The technical form of the learning resource (e.g. as RLO or OER) can assist in ad hoc and planned reuse later. CS1-H806 provided four examples of this, where resource creators were able to respond to opportunities which would have otherwise required considerable additional effort and would therefore have been unlikely to occur. If consideration is given to the advantages *to the creator* in developing reusable resources, this opening of opportunity may be a powerful motivator for reuse. That this type of reuse is not regarded as the objective of funded projects, or included in statements about the political or institutional objectives of reuse suggests that their priority is to direct practice through reuse and support knowledge transfer between users, rather than supporting less predictable opportunistic reuse.

The original impetus for RQ2 was the automated model of learning object reuse which was popular at the start of the research period. Emphasis on repurposing, rather than reuse, eroded the relevance of this in UK HE, although CS4-SORRS highlighted the importance of a more restricted model when reuse is with students rather than educators. Several cases (e.g. CS3-LORO and CS6-NDLR) evidenced an increased interest in community-based sharing and a relaxation of barriers to allow sharing beyond the institution. The growth in availability of OER

within UK HE, makes reuse in unanticipated ways and within unexpected contexts more likely.

The way in which resources are offered has shifted and become more diverse, for example emphasising low granularity in OpenCourseWare such as produced at the OU and MIT and directed at learners, or high granularity and variable quality (e.g. single images) including user-generated content less suitable for reuse and more suited to repurposing by educators.

CS5-PROWE explored the response of part-time tutors to informal sharing. This was welcomed by some, but considered too 'café-like' and lacking purpose by others. Several participants emphasised the importance of knowing where resources had originated, with some stating that they wished to connect primarily with peers (i.e. those of equivalent expertise), while others were interested in widening their interest informally. This suggests two very different motives for accessible reusable resources.

RQ3 was informed by CS1-H806 and has been answered through several of the cases, identifying student support, pedagogical flexibility and operational responsiveness. For example, not only making resources accessible, but also making accessible resources reusable, can improve the variety of resources available for disabled learners (CS2-Stòr). Perhaps the most startling thing when considering the cases has been the range of wider benefits that arose from reuse activity. Reuse which is underpinned by supply of resources which are digital and online is a potentially radical change within UK HE in making teaching practices public rather than maintaining these as private.

8.3 Changes in opportunities to use online resources post-2010

Chapter 1 identified examples of existing resource reuse within UK HE ranging from referencing another's research in academic writing, to using commercially-published texts and software. This thesis was concerned with reuse of *online digital* resources and it is reasonable

to anticipate that this type of reuse activity will grow in line with online educational activity, e.g. increases in the number of online courses offered. This data is not usually collected for UK HE (i.e. not part of the Higher Education Statistical Agency (HESA) monitoring), however research in 2010 (White, *et al.*, 2010) attempted to quantify growth in online learning in UK HE, and identify how many online courses were being offered.

From desk research these researchers established indicators of the scale of online learning in 2010, which they presented as a set of key facts, including:

- 1,528 courses offered by 113 HE and FE institutions; of which 510 were identified as being delivered online (including blended learning);
- 952 courses offered by the Open University; of which 600 were dependent on the web and a further 95 were delivered fully online; (White, *et al.*, 2010, p12)

White, *et al.* (2010) used the term ‘online and distance learning’ to describe any courses with a ‘significant component delivered to students online’ (p10), including blended or hybrid courses. Their data emphasised the OU as a large-scale distance educator (Section 7.3.1) and its importance for online education. All OU courses included at least *some* online activity (257 OU courses were described as ‘web supplemented’, i.e. online activity was optional). In contrast, given the number of UK HE and FE providers (over 500 in 2011), the mean number of substantially online courses offered (if excluding the OU), was less 1 per institution. Online educational activity is increasing in UK HE, but fully or substantially online education at the whole course level was not a dominant activity for UK HEIs other than the OU.

Reuse of online resources also occurs within principally face-to-face teaching, or within courses with a small online element which may not have been recognised in White *et al.*’s, review. A different indicator of the potential for online reuse is the number of UK HEIs with a

VLE. In 2010, research for JISC indicated that this has risen consistently across the research period, and had reached 100% amongst survey respondents (Figure 8.1).

Figure 8.1: Percentage of UK HEIs with a VLE (2001-2010)

2001 [1]	2003 [1]	2005 [1]	2008 [2]	2010 [2]
81%	86%	95%	96%	100%

Source [1]: Browne, et al. (2006)

Source [2]: Browne (2010)

While it is not known what proportion of courses within UK HEIs *use* a VLE, or otherwise access online teaching resources, Figure 8.1 suggests that the opportunity to use online digital resources as online resources existed in every UK HEI by the end of the research period. The demand for and supply of resources which are online and digital and used for HE learning and teaching can therefore be expected to expand within all UK HEIs.

8.4 Evidence of reuse post-2010

If evidence of sector engagement with online learning is hard to quantify, so too is evidence of reuse. During 2010/11 research was conducted by TALL, to address two research questions of relevance to this thesis:

- I. What benefits can OER offer to educators and learners in HE in the UK?
- II. What are the pedagogical, attitudinal, logistical and strategic factors conducive to uptake and sustained practice in the use of OER; conversely, what are the impediments?' (Masterman and Wild, 2011, p4).

The study was commissioned by JISC, who three years previously had commissioned a related study looking at the evidence base for *sharing* learning materials (McGill *et al.*, 2008). The researcher was involved in discussion with principal investigators for both projects, so aware of the challenges that each faced in locating examples of sharing and reuse within UK HE practice. Masterman and Wild's research confirmed that reuse was often associated with projects funded to engage in that activity. Other types of user could be difficult to locate;

To identify teaching staff, we started with known contacts in projects funded by JISC to create OER and enquired whether they knew teaching staff who were not directly involved in these projects but who were known to reuse OER in their teaching. This was because we wanted to minimise the effect on our findings of involvement in funded initiatives explicitly intended to promote OER. In the event, however, it proved difficult to identify more than a few such individuals. (Masterman and Wild, 2011, p5).

As Masterman and Wild's research relates to the time period following the research reported in this thesis (November 2010 – June 2011) it identifies on-going difficulties in identifying examples of technically-mediated reuse, in that case OER use. Particular problems noted in this thesis, and also encountered by Masterman and Wild, were:

- **Wide definitions of what reuse consists of.** Masterman and Wild (2011, p43) assumed that reuse of OER could include use of resources 'for ideas'. As Wiley enquired: How does OER differ from a resource that is simply freely available online? (Wiley, 2010). Cases in this thesis presented a broad range of reuse facilitation, both in scope and type.
- **Evidence of sharing was easier to find.** This reflects RQ1 which identified that evidence of providing reusable resources was easier to identify than reuse, in part

because of lengthy timescales and the uncertainty involved. Reuse activity requires an opportunity to *use* the resource, as well downloading and storing it in expectation of use. The lag between the earlier and later stages of reuse (Figure 1.1) creates particular challenges if a definition of reuse as influence is used, as there is unlikely to be any formal record of supply *or* use. The unpredictability of reuse opportunities (e.g. CS1-H806) and the change in participants at different reuse lifecycle stages continues to present particular challenges for the researcher in anticipating where to search for evidence of reuse.

- **Project activity can distort the picture of reuse.** As reuse projects are often *required* to share and/or reuse resources this can result in reuse activity which is skewed towards short-term experimental and unsustainable activity. The objectives of reuse may be funder-directed rather than user-led resulting in activity not typical of normal HEI teaching or operational processes. Longer life-span funded projects, e.g. CS6-NDLR, or successive interlinked projects, e.g. CS3-L₂0/LORO, were able to overcome the effects of being driven to evidence performance within a short time span. The NDLR had an exceptionally long pilot phase which allowed it to operate inclusively across the sector, while LORO built from earlier projects. As CS4-SORRS illustrated, the funder may be the institution rather than an external body, but the conditions placed on reuse may be even more onerous if students are required to have direct access.
- **Reuse requires additional effort with unpredictable results.** Preparing to share resources (e.g. adding metadata, and undertaking specific formatting) requires a time investment additional to the educator's normal practice. This is also true when searching for items to reuse, although in that case there could be expectation of

time saving, improvement to the resources created, or simply acquiring information and inspiration. As CS2-Stòr illustrated, staff could spend considerable time in deciding whether a resource was suitable to their context. Decisions to download a resource 'in case' may be made much more quickly as there is no specific context nor constraints to consider. Projects and institutionally-led initiatives were more likely to engage in creating resources speculatively, in *expectation of reuse*. Outside a research context, individual educators are less likely to be motivated to engage in this reuse practice, as it requires additional effort and time.

- **We may not recognise reuse when we see it.** As Chapter 2 noted, and as echoed in the quote by Kanter (2011) at the start of this chapter, there are political expectations of what resource reuse can achieve. Institutions and projects may be reluctant to acknowledge the value of local reuse, e.g. reuse by the creator, as this falls short of that ideal. Local reuse can also be hard to quantify, as it falls outside the scope of many measures. Figure 7.2 showed that there was a tendency to greater openness, moving to less proximate sharing, once sharing on a more local basis has been achieved. The reuse in CS1-H806 (Section 5.3), and the versioning mentioned in CS6-NDLR, was possible because the resources were available in a ready-to-be-reused condition. Enabling creators to more easily reuse their own resources (which CS5-PROWE indicated they wished to do even if not prepared to share these with others) would lower barriers to sharing these resources should an opportunity arise.
- **There are complex, and hidden, human factors affecting reuse with others.** Far from reuse being a simple activity akin to sharing with other children in the playground (Harrison and Smith, 2003), it requires a high level of trust and the

relinquishing of some measure of control. The lack of rewards and recognition for sharing and reuse, and uncertain views of some educators about online teaching, are impediments to reuse which have yet to be addressed. Technical innovations around reuse, e.g. open licenses, semi-automated metadata and RSS feeds, have lowered some barriers. However, as suggested in Section 7.2.1, technology and licences may ease the path to reuse, rather than motivate educators to change their teaching practice.

8.5 Open educational resources as the future of reuse

There has been considerable enthusiasm for OER reuse at international level. In 2010/11 UNESCO announced four UNESCO OER Chairs and in 2011 \$2bn funding within the US (US Department of Labor, Employment and Training Administration, 2011) was tied to release of OER. This suggests that OER activity will not only increase the supply of reusable resources, but may shift emphasis towards reuse as a mainstream approach to academic practice. The rise in popularity of open textbooks in the US, and the increased evidence for their benefits to institutions and learners (Wiley and Hilton, 2011) centres on reusing OER. The emergence of MOOCs (Massive Open Online Courses) using OER with non-formal learners has fuelled discussion within HE about where the value of university education now lies. International, and multinational enterprises such as the OER University (http://wikieducator.org/OER_university) anticipate accreditation of courses studied in the open, as reusable OER, without registration as a conventional student. In the light of rising student fees for UK HE students (Coughlan, 2010), and their worsening job prospects post-graduation (Davidson, 2009), these may provide desirable study pathways for future learners within UK HE. These 'courses' will be based on new models for education, reliant on reuse of open resources, and accessible to UK learners.

This may influence future UK HE reuse activity both directly and indirectly in the future.

Commercial initiatives have also taken technical steps towards making sharing and reuse easier within conventional VLEs. In Autumn 2011 a new type of VLE by a Pearson/Google partnership was announced. OpenClass was described as ‘an open architecture that allows instructors to import whatever material they want, from e-books to YouTube videos’, (Fischman, 2011). Blackboard, an established VLE provider, during the same week announced plans to introduce a ‘share’ button to allow access to content in its platform by users other than registered students (Young, 2011).

During the same month, Stanford Engineering working with Google was offering an ‘open class’ in Artificial Intelligence (AI Class.com, 2011). This was a whole course as OER, unlike the part-courses offered by MIT, OpenLearn and others. The class was exposed in a way that allowed non-registered students to lead their own learning activity with, or apart from, the registered students on this free course. There were Facebook groups (including Thai and Spanish versions), Google groups and hangouts, a YouTube channel and Twitter feeds to support this course (The Rohan Aurora, 2011). This trio of examples illustrates the speed of innovation and the range of stakeholders involved in the future of reuse facilitation, from publishers and top universities, Google and Blackboard, to independent learners and registered students (both paying and non-paying).

Weller (2011) has written about the opportunities and challenges of digital scholarship, suggesting that the established closed systems used to publish and recognise research are no longer applicable. He has suggested that the digital scholar is also an open scholar (i.e. open to sharing and reuse), which suggests that changes in research *and* teaching may occur.

Investment in fostering reuse of teaching resources has been directed not only at achieving

efficiency in course production, but also in changing educational practice. Weller is suggesting an analogy with open access and new approaches to research dissemination (i.e. reuse of these outputs). While not all cases reviewed in this thesis showed widespread reuse activity, they did indicate that to achieve resource reuse in UK HE in the future, not only technical constraints, but also the quality and motivational concerns, must be addressed. Emphasis needs be placed on putting users (educators and students) at the heart of resource reuse if this is to move beyond political aspiration and realise its full potential. If Weller is correct in his assumptions at least the practice of research and teaching may be more favourably aligned for the future.

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Glossary

ADL	Advanced Distributed Learning initiative.
AL	Associate Lecturer, a part-time tutor at the OU.
APEL	Accreditation of prior experiential learning, allowing previous experience (or training) to be recognised by a HEI and counted towards a qualification.
Becta	British Educational Communications and Technology Agency, led UK government's e-strategy in schools and colleges until 2010, when closed.
CALRG	Computer-Assisted Learning Research Group, a research group within IET
CETIS	JISC's Centre for Educational Technology and Interoperability Standards.
CETL	Centre for Excellence in Teaching and Learning. From 2005-10 74 CETLs were funded by HEFCE. Total funding was £315m.
CoP/CoPs	Community of Practice/Communities of Practice
course	Used interchangeably with module to describe discrete segments of award-bearing HE study.
Creative Commons	Alternative copyright licensing scheme advising potential users of their rights to use resources, which in some forms allowed repurposing. An example of an 'open license' used with open educational resources.

CS1-H806	Case Study 1: H806 – the Learning in a Connected Economy course
CS2- Stòr	Case Study 2: Stòr Cùram – national social work repository initiative. The phrase Stòr Cùram translates as ‘storehouse of care’ in Scottish gaelic
CS3-L ₂ 0/LORO	Case Study 3: L ₂ 0 and/or LORO – two linked Language resource sharing initiatives (see also L ₂ 0 and LORO)
CS4-SORRS	Case Study 4: SORRS - repository project within the OU Department of Health and Social Care (see also SORRS)
CS5-PROWE	Case Study 5: PROWE – informal and personal repositories project (see also PROWE)
CS6-NDLR	Case Study 6: NDLR – national repository initiative based on CoPs (see also NDLR)
DCS	Data Capture Suite. A research environment allowing observation and recording of human-computer interaction.
DfES	Department for Education and Skills. The government body responsible for UK HE during the research period.
ECMS	Enterprise Content Management System. An institutional document storage, retrieval and delivery system which can be compared to a repository.
Eduserv	Non-profit organisation that supports UK HE use of educational software. Eduserv also conducts and funds research into educational technology.

FE	Further Education, used in the UK to refer to post-16 education, usually in colleges, excluding school- and university-based education.
granularity	Refers to the size of the resource, usually measured in student study time. Greater granularity equates with smaller resources.
HE	Higher Education. Degree-level education in colleges and universities.
H806	OU Course: Learning in the Connected Economy (the subject of CS1-H806).
H850	OU course: Postgraduate Certificate in Learning and Teaching in Higher Education (referred to in CS1-H806).
HEA	Higher Education Academy. Founded in 2004 with responsibility for the 24 Subject Centres and the accreditation programmes such as H850. The HEA has also, with JISC, funded and supported OER project activity (JISC, 2008).
HEFCE	Higher Education Funding Council for England, funds teaching in UK HE.
HEI	Higher Education Institution, usually a university.
HESA	Higher Education Statistics Agency. Collects and publishes statistics on UK HE.
HSC	Health and Social Care, a teaching faculty at the OU. Previously known as SHSW.
IEEE	Institute of Electrical and Electronics Engineers. A US-based professional body which has led standards development, e.g. IEEE LOM standard.

IET	Institute of Educational Technology, a teaching and research department within the OU.
IPR	Intellectual Property Rights which includes Copyright. The phrase is sometimes shortened to 'rights'.
IRISS	Institute for Research and Innovation in Social Services, Glasgow-based organisation which incorporates SIESWE and the Learning Exchange.
JISC	Joint Information Systems Committee.
Jorum	JISC-funded national repository for HE and FE educational resources.
JorumOpen	The open educational resource repository within Jorum
L ₂ 0	Sharing Language Learning Objects JISC-funded project based at Southampton University and working across other HEIs and colleges in SE England.
LCE	Learning in the Connected Economy course, usually referred to as H806.
LCMS	Learning Content Management System. The part of the virtual learning environment which stores and presents online resources to students. More usually described in UK as VLE.
LMS	Learner Management System. The part of the VLE managing, tracking and recording student activity.
LOM	Learning Object Metadata. An agreed standard for describing learning objects

which can also be applied to other learning resources.

LORO	Languages Open Resources Online, a repository project and service based in the OU Department of Languages. One of two examples within Case 3.
M150	Online OU course, Data Computing and the Net, which employed a large number of ALs who had previously taught on T171.
metadata	Description of the resource, often in machine-readable form to allow effective discovery.
MEDEV	The HEA subject centre for Medicine, Dentistry and Veterinary Medicine.
MERLOT	Multimedia Educational Resource for Learning and Online Teaching repository.
MIT	Massachusetts Institute of Technology. The founder of the Open Courseware Consortium.
NDLR	National Digital Learning Repository of Ireland, more recently known as National Digital Learning Resources.
OER	Open educational resources. Alternative terms are 'open content' or 'open resources'. Refers to educational resources issued with an open licence.
OpenLearn	The OU initiative offering selected OU content as open educational resources.
OU	The Open University, a distance teaching university based in Milton Keynes

UK with 13 regional offices distributed across the UK.

PROWE Personal Repositories Online: Wiki Environments. JISC-funded project based at the OU and University of Leicester. Basis of Case 5.

referatory Term used to describe a repository which links to instead of hosting the resources. MERLOT is a referatory-type repository.

repository Searchable collection of resources tagged with metadata.

RLO Reusable Learning Object. The precise definition of an RLO is disputed (see Section 3.3).

RLO-CETL CETL based on researching and supporting production and sharing of RLOs. Led by London Metropolitan University.

ROI Return on investment. Financial measure of the profit/loss from a venture.

RSS Really Simple Syndication. Web feed formats used to publish frequently updated works, e.g. blog entries, in a standardised format.

SCORE Support Centre for Open Resources in Education. A national OER initiative based at the OU whose activity including funding fellowship projects.

SCORM SCORM is an interoperability standard, often associated with reusable learning objects which allows easy exchange of packages of content with attached metadata to facilitate reuse across different learning platforms.

SHSW	School of Health and Social Work, a faculty at the OU which became HSC.
SIESWE	Scottish Institute of Excellence in Social Work Education. Funder of Case 2: Stòr Cùram which developed the Learning Exchange repository for SIESWE.
SORRS	Shared Online Resources Repository System project based in SHSW and later HSC at the OU. Developed the HSC Resource Bank. The basis of Case 4.
T171	You, Your Computer and the Net, an online course with an exceptionally large student and tutor population. TU170 was a shorter version of this course.
T186	The OU course Understanding e-learning: a guide for teachers and learners, created from reused learning objects from H806.
TALL	Technology-Assisted Lifelong Learning. Research and distance learning delivery unit within the Department of Continuing Education, Oxford University.
UCEL	Universities' Collaboration in eLearning. Based at Cambridge University. A closed consortium of learning object creators and users which informed development of the RLO-CETL, in which Cambridge University was a partner.
UKeU	UKeUniversity. The UKeU was funded by HEFCE to help UK HEIs engage with, and offer courses as, elearning to an international market. It was disbanded in 2004 following failure to recruit students.
UKOER	The acronym used to refer to the JISC/HEA UK OER programme which started

in 2009 and in 2011 is entering its third phase.

UoL University of Leicester. A partner with the OU in Case Study 5: PROWE project.

VLE Virtual Learning Environment. The term used in the UK to refer to systems such as Blackboard and Moodle which deliver online learning to students and also manage student activity online.

XML Extensible Markup Language. A standards-compliant format for documents and webpages which allows their content to be extracted and reused more easily in other formats.

Appendices

Appendix 1: Participants in Interviews and observations

Where comments drawn from interviews have been reported within this thesis, these have been anonymised. In CS1-H806 all interviewees were students of the same course population, with all available students interviewed and no selection involved. Information about this set of respondents is provided within the case (Section 5.4.2).

In Cases 2-6 the interviewees were selected to represent specific participants within the case, or where only one was selected, a key participant. Each was working with or within a project, was a user or potential user of the outputs, or represented some combination of these interests. Each is identified individually within the thesis by a unique code which includes the name of the case in which they appear (e.g. PROWE A, Stor (Stòr Cùram) B, NDLR C etc.). This approach is used to assist in cross-case comparison of their comments, while retaining awareness of the case connection.

To further facilitate comparison Table 1 provides summary information of interview participants from Cases 2-6. This identifies for each, the project name and timeline (if appropriate), date of the interview (month/year), and circumstances of the interview: face to face with individual (F2FI), face to face as part of a group (F2FG), by telephone (T), or as part of a Data Capture Suite observation (DCS).

Each of those selected for interview for Cases 2-6 was an educator actively involved in the design, delivery and/or support of teaching in UK or Irish HE (see below for individual background information). Some interviewees held several roles (e.g. provider and user) and

worked across several contexts and HEIs, or had experience of doing so. The information on individuals notes the interviewee's primary role(s) within the case which informed the selection for interview. In some cases other roles were identified during the course of the interview and, where relevant, these are referred to in the thesis.

All interviews for Cases 2-6 were audio recorded and transcribed. The researcher was the sole interviewer/observer for all but one of the interviews (STOR A), where she was co-observer.

Table 1

Identified as:	Gender	Project dates	Method
Case 2: Stòr Cùram			
STOR A	M	Oct 2003 – Jul 2005	DCS
STOR B	M	Oct 2003 – Jul 2005	DCS
Case Study 3: L₂0 and LORO			
L ₂ 0 A	F	Jan 2005 – Jul 2006	Telephone
LORO A	F	Apr 2009 – Jun 2010	F2FI
Case Study 4: SORRS			
SORRS A	M	Late 2004 – Jan 2008	Telephone
SORRS B	M	Late 2004 – Jan 2008	Telephone
SORRS C	F	Late 2004 – Jan 2008	Telephone
SORRS D	M	Late 2004 – Jan 2008	Telephone

Case Study 5: PROWE			
PROWE A	M	Jun 2005 – Jul 2007	Telephone
PROWE B	F	Jun 2005 – Jul 2007	Telephone
PROWE C	F	Jun 2005 – Jul 2007	Telephone
PROWE D	F	Jun 2005 – Jul 2007	Telephone
PROWE E	M	Jun 2005 – Jul 2007	Telephone
PROWE F	M	Jun 2005 – Jul 2007	Telephone
PROWE G	M	Jun 2005 – Jul 2007	Telephone
PROWE H	F	Jun 2005 – Jul 2007	Telephone
PROWE I	F	Jun 2005 – Jul 2007	Telephone
PROWE J	M	Jun 2005 – Jul 2007	Telephone
PROWE K	M	Jun 2005 – Jul 2007	Telephone
PROWE L	M	Jun 2005 – Jul 2007	F2FG
PROWE M	M	Jun 2005 – Jul 2007	F2FG
PROWE N	F	Jun 2005 – Jul 2007	F2FG
Case Study 6: NDLR			
NDLR A	F	2004 to date	Telephone
NDLR B	F	2004 to date	Telephone
NDLR C	M	2004 to date	Telephone

Interview and data capture suite participants

STOR A

An experienced Lecturer in Social Work, working within the then School of Health and Social Work (SHSW) at the Open University with a background in, and first-hand knowledge of, the Scottish Social Work system and the new social work curriculum in Scotland. He had seen a demonstration of Stòr Cùram twelve months previously and had met the Stòr Cùram project manager.

STOR B

This Lecturer in Social Work had been recently appointed within the OU's HSC with prior experience as an OU associate lecturer (AL) in Social Work. He had ten years' experience lecturing Diploma in Social Work students at other HEIs, and five years as a senior manager in a local authority children's department. He was at the time of the observation part of an OU production course team, and chair of a course in presentation.

L₂0 A

She was a lecturer in the Department of Languages at Southampton University seconded since 2003 to projects within that department relating to the design, creation and supply of online digital learning resources. She had experience in designing and authoring online course content and was familiar with the concept of learning objects. She has advised and supported partner HEIs in developing and using reusable learning objects.

LORO A

She was a lecturer in the Department of Languages at the Open University, also an experienced AL, teaching languages at the OU. She acted as Project Manager of LORO and initiated the idea of a departmental repository. LORO A continued to lead the project after JISC funded ended, and at the time of the interview was applying for a SCORE fellowship to relate her personal research to open educational resource activity and LORO.

SORRS A

Senior academic within the OU's SHSW, and an experienced chair of OU courses in production and presentation. He was chair of the SORRS Steering Group at the time of the interview and had been involved in the project since it started. Resources he had developed initially as print resources (Law Cards for Social Work students) were one of earliest and most extensive resources to have been shared using SORRS. These had already reused across other HSC courses.

SORRS B

Recently appointed Lecturer within the OU's SHSW, with considerable experience in researching reuse within the OU as a Project Officer on the CURVE project. At the time of the interview he was chairing a SHSW course in production which was expected to use SORRS as a resource for its students and as a service for the course team.

SORRS C

Appointed as Lecturer within the OU's SHSW in 2006 to lead development and implementation of SORRS. Considerable previous experience of OU course production and support as a course manager, and also experience as an OU AL. Her prior experience was gained within a different OU faculty, but using the same OU-wide systems.

SORRS D

Senior manager within the OU's SHSW (as Associate Dean with responsibility for course production). He had considerable experience of the production and use of resources within the OU at departmental and institutional level, and past experience of both authoring OU resources and developing new staff in this role. Sponsor of the SORRS project.

PROWE A

Experienced OU AL, tutoring and moderating online courses for Maths and Technology departments (previously separate faculties but now amalgamated into Maths, Computing and Technology) At time of the interview teaching M150. Familiar with and user of online systems such as digg (<http://digg.com>) .

PROWE B

Experienced AL teaching at the time across eight small population courses, including project courses and Openings course (i.e. OU access course) in Mathematics for four OU regions (North, North West, East and West Midlands). Her son, at the time of the interview, was keeping a blog for research purposes, so she had some familiarity with the technology.

PROWE C

Experienced AL, at the time of the interview teaching on two Openings courses for North West region, although she was also a tutor on M150. She had prior experience in developing 'a taster website for tutoring on' while an OU AL.

PROWE D

Experienced OU AL teaching M150 and M225 (both Maths and Computing faculty courses) for East of England region. She referred in the interview to using Google to store documents for private use. She mentioned that she was that the PROWE system would not be sustained once the project ended.

PROWE E

Experienced OU AL, at the time of the interviews teaching four Arts courses as a London region tutor. Courses ranged from first level undergraduate to postgraduate level, with a specific role in teaching film and television studies across those courses.

PROWE F

Experienced OU AL teaching online Arts Foundation and a first level Technology course (T175), working within the same region and co-authoring staff development resources with interviewee PROWE G.

PROWE G

An experienced OU AL, using a personal website to share resources with students. He was tutoring M150 and T175 at the time of the interview. Also working on staff development with interviewee PROWE F and involved as an AL consultant with the setting up of OpenLearn, the OU's open educational resource repository.

PROWE H

An OU AL who also worked at the time of the interview as a researcher at University of Leicester in the Beyond Distance Alliance team. It was in this role that she was interviewed.

PROWE I

Lecturer in Company Law at the University of Leicester, teaching mainly on-campus with some contact with postgraduate distance taught students.

PROWE J

Professor in Languages at the University of Leicester (UoL). This department offered distance teaching within the University of Leicester although the interviewee was not himself a distance tutor and had not used Plone (the UL system). Experienced in using Blackboard for teaching and supporting students.

PROWE K

Lecturer in Biochemistry at the University of Leicester with experience in using blogs and RSS. Very aware of online developments and had already used Wikipedia to teach students.

Had used Plone (the UL system). Not himself a distance tutor.

PROWE L

Professor based in the University of Leicester Cardiovascular Sciences Department at Leicester Royal Infirmary (i.e. not on the main campus). Co-located with interviewees PROWE M and PROWE N. Experienced in using Blackboard for teaching. Used wiki as inter-departmental resource.

PROWE M

Lecturer based at Cardiovascular Sciences Department with interviewee PROWE L and PROWE N. Used wiki as inter-departmental resource.

PROWE N

Lecturer based at Cardiovascular Sciences Department with interviewee PROWE L and PROWE M. Responsible for uploading resources to the wiki, which was used as inter-departmental resource.

NDLR A

Project Manager of the NDLR project, and main contact for the project since 2005. Based at Trinity College Dublin. Had also previously, temporarily, led community of practice (CoP) activity.

NDLR B

Part-time helpdesk administrator, and previously researcher working for NDLR and based at University of Limerick. Background in multimedia design. At the time of the interview she was also working with academics at Limerick to develop interactive learning objects for NDLR.

NDLR C

Lecturer at University College Dublin and member of the NDLR Board with responsibility for staff development and licenses.

Appendix 2: Questions posed during evaluation for Stòr Cùram learning objects

The questions listed below were addressed to each lecturer-participant for each of the four learning objects reviewed. Responses were recorded within IET's data capture suite. This simultaneously captured views of the on-screen activity to which they referred, the audio comments, the facial expression of the participant and their position in relation to the computer, observer/interviewer and the activity sheet and desk.

Before starting the recording the format of the interview and the technical set up of the data capture suite was explained. A brief statement was read out, explaining the nature of the resources and the aims of the Stòr Cùram project. The researcher was present in the room for both recordings sitting out of direct view of the lecturers, who were aware she was there. In the recording of STOR A, Dr Anne Jelfs introduced the activity. She and the researcher jointly commented on and queried the activity observed. For the recording with Lecture B, Dr Jelfs was not present.

Each lecturer was asked to refer to a printed list of questions and comment aloud as they viewed the resources. The questions were:

1. Is this a topic that you have yourself yourself studied or taught?
2. How might you use this in a face-to-face setting (e.g. a tutorial or a summer school)?
3. How might you use it remotely (online only access or presented on a CD or DVD)?

4. How otherwise might you use this as a teacher? How might other teachers (e.g. OU tutors) use it or respond to it?
5. How might learners use it and respond to it?
6. What other audiences might this be suitable for? E.g. CPD?
7. Is there anything about this LO that makes it less suitable for certain audiences or certain teachers?
8. How did you find the navigation? Presentation? Style? Content?
9. Can you suggest any improvements?
10. How would you use this material?
11. Would you wish to make any changes before using it?
12. Do you currently use any material from repositories or third party collections in your teaching?
13. Any other comments?